



# **Massachusetts Health Care Cost Trends Final Report**

## **Appendices A.1a – A.3b: Preliminary Reports Issued by the Division of Health Care Finance and Policy**

**April 2010  
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Deval L. Patrick, Governor  
Commonwealth of Massachusetts  
Timothy P. Murray  
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### Note

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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.1a**

### **Part I: The Massachusetts Health Care Cost System in Context: Costs, Structure, and Methods Used by Private Insurers to Pay Providers**

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# **Massachusetts Health Care Cost Trends**

## **Part I: The Massachusetts Health Care System in Context: Costs, Structure, and Methods Used by Private Insurers to Pay Providers**

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February 2010



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## Executive Summary

The Massachusetts health care system is a critical component of the state's economy. Health care is the state's top industry, the largest employer of Massachusetts residents, and accounts for over 13 percent of its \$365 billion Gross State Product (GSP). The Commonwealth Fund ranks Massachusetts first in terms of access to care and seventh overall among states on its *State Scorecard*, which measures health system performance. Massachusetts hospitals are often cited as among the best in the nation in terms of the quality of health care services provided, scoring higher than national average on treatment of major conditions. Furthermore, Massachusetts health insurers are consistently rated among the top ten best plans in each category nationwide.

At the same time, Massachusetts is grappling with escalating health care costs, which are consuming a greater portion of the economy and lowering real wage growth. Some of the cost growth is driven by system-wide challenges, such as an aging population and the greater use and availability of increasingly complex levels of medical care, much of which can be uncoordinated. To that point, Massachusetts ranks in the lowest quartile of states for avoidable hospital use and costs on the *Commonwealth Fund State Scorecard*. However, some challenges, such as those that stem from the structure of the health care market place, are unique to Massachusetts and must be considered when identifying strategies to mitigate health care cost growth.

## About this Report

This report examines the factors that contribute to high health care costs in Massachusetts, including the structure of the health care system and the payment methods currently used by Massachusetts health insurers. Understanding these factors will better prepare the Commonwealth to evaluate and develop reforms that have the potential to simultaneously contain cost growth and improve quality.

Data describing the Massachusetts health care system are drawn from various published sources. Data on payment methods are based on the results of a 2009 questionnaire administered for the Division of Health Care Finance and Policy, in which Massachusetts insurers documented the ways in which they pay hospitals, physicians, and intermediary organizations (medical groups, Independent Practice Associations [IPAs] and physician-hospital organizations [PHOs]).

## Summary of Key Points

The data presented in this report suggest that the Massachusetts health care system has several unique characteristics that make it different from the rest of the country, some of which may contribute to its high health care costs:

1. A health care system with many highly specialized medical personnel and the strong presence of academic medical centers.

2. The greater availability and use of more academic medical centers for both inpatient and outpatient hospital-based services. Moreover, market consolidation and concentration has allowed certain providers to leverage and receive higher payments from insured patients.
3. The dominance of fee-for-service payment methods, which do not provide incentives to coordinate care or deliver services in more cost-effective, appropriate settings.
4. Richer insurance benefit packages than in other parts of the country.

## Health Spending Trends

Personal health spending per capita is higher in Massachusetts relative to the nation, but growth in spending has followed a trend similar to that of the U.S. (see Figure 1). In 2004, health spending per capita in Massachusetts was 27 percent higher than the U.S. average (\$6,683 versus \$5,283). After adjusting for non-patient revenues (such as federal grants and investment income) and regional wage differences, personal health spending in Massachusetts is 15 percent higher than the national average. In particular, adjusted per capita spending on home health and nursing home services is considerably higher in Massachusetts than in the U.S.

## Overview of the Massachusetts Health Care System

The Massachusetts health care system is characterized by a high number of highly specialized medical personnel and the strong presence of academic medical centers. Massachusetts has the highest physician to population ratio in the nation and a higher proportion of specialists than in any other state even after controlling for interns, residents, fellows, and researchers. In 2006, about 46 percent of licensed hospital beds in Massachusetts were in academic medical centers, compared to 19 percent nationally. Massachusetts has more than twice as many medical residents per capita compared to the U.S. average, with 90 percent of these residents located in hospitals in the greater Boston area.

A large proportion of services in Massachusetts are provided in academic medical settings. The influence of academic medicine continues to expand throughout Massachusetts as Boston academic medical centers build outpatient facilities in the suburbs. Greater inpatient and outpatient use in academic medical centers has implications for health care costs, as academic medical centers charge higher prices relative to community hospitals.

Academic medical centers contribute significantly to the state economy. In 2007, per capita economic activity contributed by academic medicine in Massachusetts totaled \$4,522. Furthermore, Massachusetts receives more NIH funding per capita than the rest of the U.S.—at nearly \$350 per capita compared to less than \$70 per capita nationally—in large part through the research activities of academic medical centers.

Massachusetts has a higher health maintenance organization (HMO) penetration rate than the U.S. (33 percent compared to 23 percent nationally), but the prevalence of traditional closed (or selective) provider network HMOs is diminishing. There has been a national movement away from capitation in the past decade, and HMOs in Massachusetts are not required to offer selected provider networks or share financial risk with providers. Moreover, the market share of preferred provider organizations (PPOs) in Massachusetts increased from 32 percent in 2003 to 59 percent in 2007, similar to the 2007 U.S. average of 61 percent.

## **Methods Used by Health Insurers to Pay Providers in Massachusetts**

A 2009 survey conducted for the Division of Health Care Finance and Policy offers insight into the methods used by health insurers to pay providers in their private HMO, PPO, and public (Medicare and Medicaid) products. The survey of 13 health insurers in Massachusetts indicates that:

- Fee-for-service payment methods, which offer few incentives to reduce the volume of unnecessary or inappropriate services, are the dominant method of payment in all types of plans. PPOs, which represent the majority of commercial members, reported no capitation payments (payments made per member rather than per service). HMOs used capitation to pay a small proportion of primary care providers (PCPs) and specialists - 16 percent and 5 percent, respectively.
- On average, capitation payments were used to pay a higher percentage of PCPs in the largest Medicare and Medicaid products (33 percent and 35 percent respectively) than in the largest commercial HMO products (16 percent).
- Diagnosis-related groups (DRG) and per diem payments were the most common form of payment for inpatient hospital services and reward high utilization, not outcomes. For outpatient hospital services, little financial risk was shifted to providers: discounted charges, payment per case, and payment per visit were the most common payment methods.
- Nearly half of all HMOs and half of all insurers share financial risk with one or more medical groups through contracts, meaning that they pay these provider groups based on groups of services, or on a per person basis (capitation) or pay them using fee-for-service alongside other types of incentives to keep costs under control. These types of risk contracts can, if applied to a sufficient share of payments, create incentives to reduce the volume of unnecessary services provided and enhance coordination of care.

## Introduction

The Massachusetts health care system is a critical component of the state's economy and factor in the vitality of its communities. Health care is the state's top industry, the largest employer of Massachusetts residents, and accounts for over 13 percent of its \$365 billion Gross State Product (GSP). The Commonwealth Fund ranks Massachusetts first in terms of access and seventh overall among states on its *State Scorecard*, which measures health system performance. According to the Hospital Compare website, Massachusetts hospitals score higher than national average on treatment of major chronic diseases and hospital infections.<sup>2</sup> Based on the member satisfaction, prevention, and treatment measures established by the National Committee for Quality Assurance, several commercial plans, Medicare plans, and Medicaid plans based in Massachusetts were consistently rated among the top ten best plans in each category nationwide.<sup>3</sup>

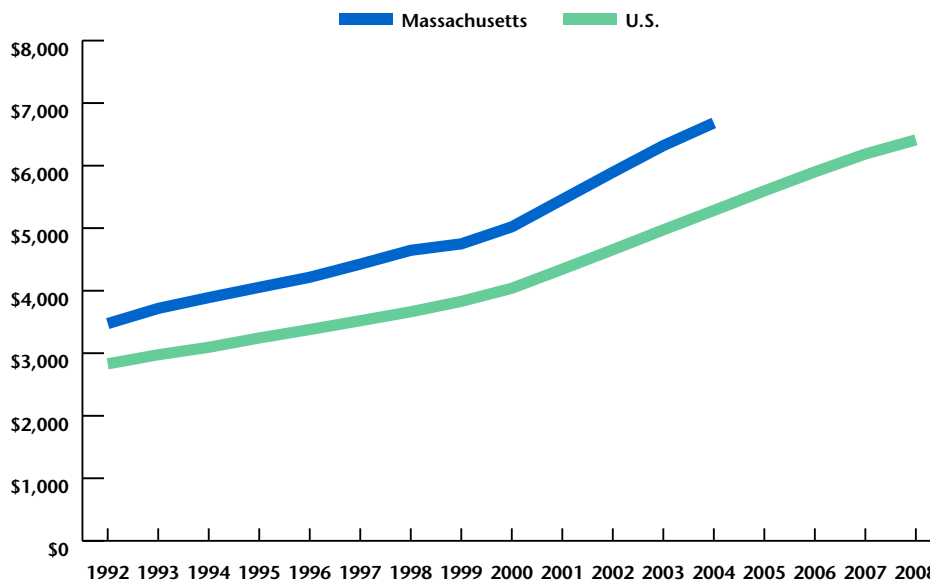
At the same time, Massachusetts is grappling with escalating health care costs which are consuming a greater portion of the economy and lowering real wage growth. Some of the cost growth is driven by system-wide challenges, such as an aging population and the greater use and availability of increasingly complex levels of care. Massachusetts ranks in the lowest quartile of states for avoidable hospital use and costs on the *Commonwealth Fund State Scorecard*. Some challenges, such as those that stem from the structure of the health care market place, are unique to Massachusetts and must be considered when identifying strategies to mitigate health care cost growth.

# Massachusetts Health Spending Trends Compared to the Nation

## Massachusetts Per Capita Health Spending Compared to the Nation

Historically, per capita health spending has been higher in Massachusetts relative to the nation, but has grown at a rate similar to that of the U.S. From 1992 to 2008, per capita health spending in the U.S. more than doubled, growing from \$2,830 to \$6,411, or 5.5 percent annually (Figure 1). The difference between Massachusetts and the U.S. increased from 22 percent in 1992 to 27 percent in 2004, likely due to broader insurance coverage and more generous benefits in Massachusetts compared to the nation, but could also point to underlying delivery system structures which have promoted greater cost growth in Massachusetts than elsewhere.<sup>4,5</sup> Comprehensive health spending estimates at the state level including Massachusetts are available only through 2004.

**Figure 1: Massachusetts Historically Has Had Higher Per Capita Personal Health Spending than the U.S.**



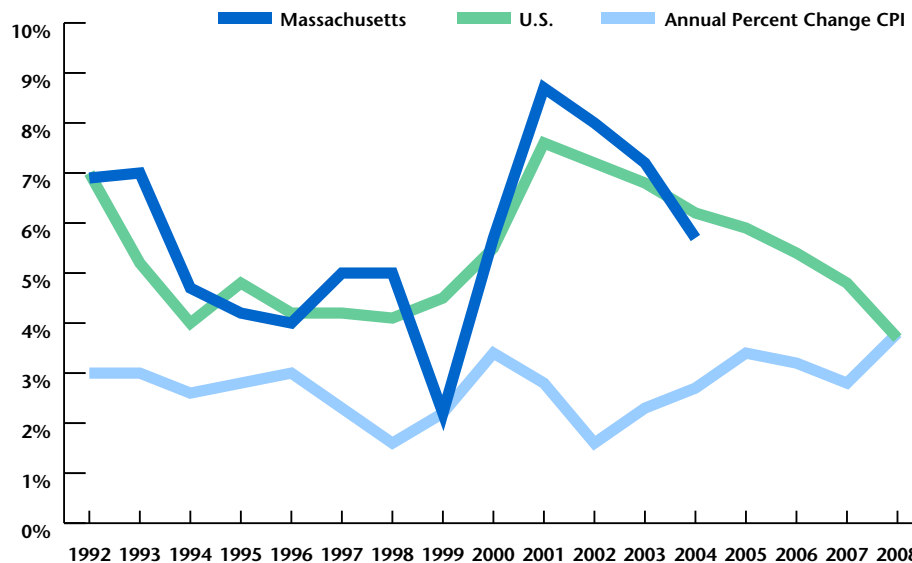
Source: Centers for Medicare & Medicaid Services (CMS), Office of the Actuary, National Health Statistics Group. (<http://www.cms.hhs.gov/NationalHealthExpendData/downloads/tables.pdf>).  
 Note: Massachusetts rates provided by CMS are available only through 2004.

## Annual Growth in Per Capita Health Spending Compared to the Nation

Personal health spending growth rates have varied over time for both Massachusetts and the U.S., with trends declining since 2002 toward lower rates of growth (Figure 2). In 2008, growth in per

capita personal health spending for the nation decreased to 3.7 percent. Nationally, the increase in health care spending over time has been associated with: greater use and availability of health care personnel and high cost medical facilities; increasingly complex levels of resource use; fragmented health care organization and payment which can lead to provision of unnecessary services; and the prices that these services can command in the market place.<sup>6,7,8</sup>

**Figure 2: Annual Growth in Per Capita Personal Health Spending for the U.S. and Massachusetts Follows Similar Trends**



Note: Data on annual growth in per capita health spending is currently unavailable for Massachusetts after 2004.  
Sources: Centers for Medicare & Medicaid Services (CMS), Office of the Actuary, National Health Statistics Group, 2007; U.S. Bureau of Labor Statistics.

Trends in health spending growth over time have been similar for Massachusetts and the U.S., and can be explained in part by the same factors that have contributed to U.S. spending growth:

- In the 1970s and 1980s, thirty states (including Massachusetts) had hospital rate-setting systems. Many states ended their rate setting programs in the early 1990s. Massachusetts' rate-setting system allowed health maintenance organizations (HMOs) unlimited discounts on hospital admissions. In 1991, when the presence of HMOs in the state market was significant as well as their level of discount, a decision was made not to treat HMOs similarly to other plans but rather to discontinue rate regulation.<sup>9</sup>
- The success of HMOs in the early 1990s, with their emphasis on restricted networks, utilization management, and provider risk sharing, led to decreased hospitalizations and slower health spending growth between 1992 and 1999.<sup>10</sup> Massachusetts mirrored the national trend but its health care costs grew faster between 1992 and 1995.

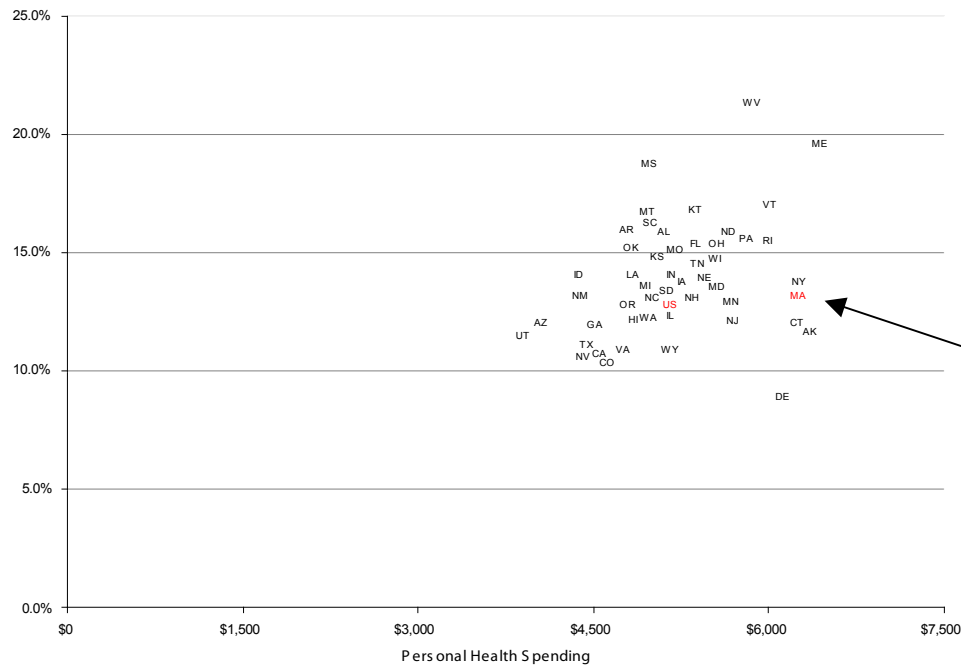
- Beginning in the late 1990s, enrollment in preferred provider organizations (PPOs) increased as the public, employers, insurers, and physicians reacted against the “gatekeeping,” utilization review, capitation, physician panels, and smaller payment increases that became synonymous with HMOs.<sup>11</sup> PPOs’ emphasis on open, less restrictive networks and fee-for-service (FFS) payments generated substantially higher growth in spending.<sup>12,13</sup> After experiencing its lowest growth rate in 1999, Massachusetts health care spending grew faster than the national average for most of the next five years.

Some studies at the national level suggest that hospital consolidation in the 1990s helped to fuel the growth in hospital prices in recent years.<sup>14, 15, 16</sup> Hospital consolidation may increase hospital market power, enabling hospitals to charge higher prices.<sup>17</sup> Furthermore, the level of competition in the market is reduced following each given merger because there are fewer competing entities, enabling both merging and non-merging hospitals to raise their prices.<sup>18</sup> Both nationally and in Massachusetts, hospital rate regulation, effective in holding down rates in the 1980’s, was dropped in favor of managed care, which was credited with reducing the rate of overall expenditures increases. The short-term success of managed care was linked directly to its ability to develop greater efficiencies in service use and to obtain lower prices from hospitals because of excess bed capacity. However, as the health care system adjusted to these market forces over time, providers became more powerful through consolidation, thereby reducing the level of competition by shrinking the number of competing entities.<sup>19,20</sup>

## Massachusetts Health Spending as Percent of GSP Compared to Other States

In comparing Massachusetts to other states on per capita health spending as a percent of Gross State Product (GSP), the Commonwealth ranks near the middle at 13.3 percent (Figure 3).<sup>21</sup> Therefore, although Massachusetts has higher per capita spending, the economy also generates more income leading to higher average earnings among Massachusetts residents compared with many other states.

**Figure 3: Personal Health Care Spending as a Percent of Gross State Product (GSP)**



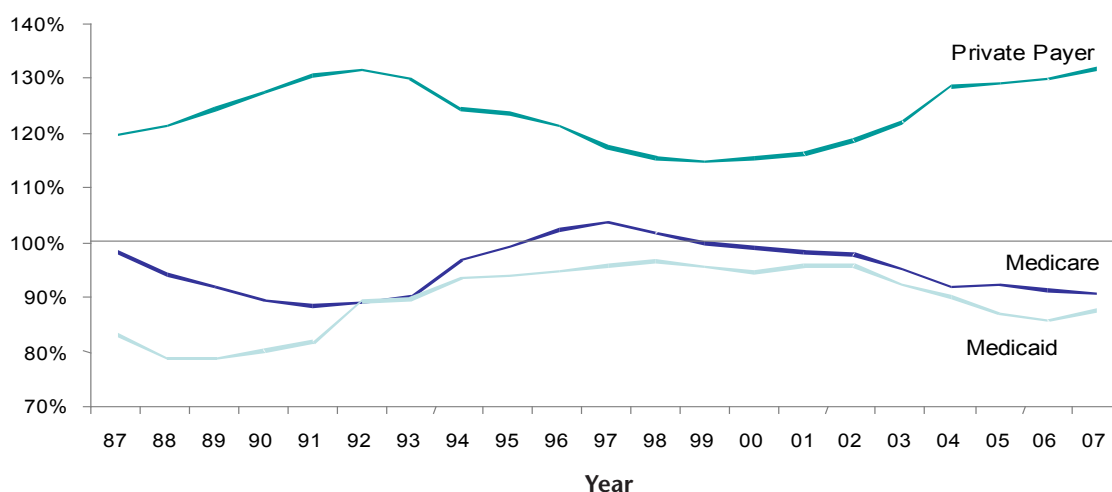
Source: CMS Health Expenditures by state of residence, 2004 <http://www.cms.hhs.gov/NationalHealthExpendData/downloads/res-us.pdf>.  
Per capita personal health spending net of non-patient revenue.

## Health Care Prices

Higher rates paid to providers have contributed to the growth in total U.S. health care spending.<sup>22,23</sup> However, public and private insurers have experienced different price trends. Medicare and Medicaid have limited their own price increases since 1998, the first year of the Balanced Budget Act. Since that time, private payers have paid higher prices in relation to public payers.<sup>24,25</sup> Nationally, in 2007, private payers paid hospitals 132 percent of their costs on average, up from 115 percent in 2000 (Figure 4). In contrast, Medicare paid hospitals slightly above 90 percent of their costs in 2007, down from approximately 98 percent of their costs in 2000.<sup>26</sup> Comparable estimates for hospitals in Massachusetts are not available. The ability of hospitals to negotiate higher payments varies widely. Certain hospitals, particularly those with more financial resources and market power, are able to demand higher rates from private insurers.<sup>27</sup>



**Figure 4: U.S. Hospitals Shift Costs to Private Payers, 1987-2007**  
**Percent of Hospital Costs that Are Paid**



Note: Medicaid payments include Medicaid Disproportionate Share payments.

Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2007, for community hospitals in AHA Chartbook: Trends affecting hospitals and health systems, 2009.

## Massachusetts Health Care Spending by Type of Service Compared to the Nation

To understand how the cost of patient care compares between markets and regions, it is necessary to adjust for differences in non-patient revenue reported by hospitals (such as research grants and investment income) and local health care wages, both of which are much higher in Massachusetts than the national average. For instance, Massachusetts hospitals received between two to three times as much non-patient revenue in 2004 than the U.S. hospital industry average.<sup>28</sup> After adjusting for non-patient revenues and regional wage differences, Massachusetts health spending was 15 percent higher than the U.S. average in 2004, considerably less than the 27 percent difference prior to these adjustments (see Appendix for adjustment methodology).

As shown in Table A, for certain medical services, Massachusetts spending is higher than the U.S. average, including: hospital care (both inpatient and outpatient facilities), dental, home health, prescription drugs, and nursing home care. In particular, Massachusetts has significantly higher per capita spending on home health and nursing home care services.

**Table A: Per Capita Personal Health Spending in Massachusetts is Higher than the U.S., even after Adjusting for Differences in Non-Patient Revenue and Geographic Wage Index, 2004**

	Unadjusted			Adjusted for Non-Patient Revenue <sup>a</sup>			Adjusted for Non-Patient Revenue & Wage Index <sup>b</sup>		
	MA	US	Difference	MA	US	Difference	MA	US	Difference
Total	\$6,683	\$5,283	26.5%	\$6,430	\$5,245	22.6%	\$6,025	\$5,243	14.9%
Hospital	\$2,620	\$1,931	35.7%	\$2,367	\$1,894	25.0%	\$2,242	\$1,892	18.5%
Physician	\$1,416	\$1,341	5.6%	\$1,416	\$1,341	5.6%	\$1,264	\$1,341	-5.7%
Other Professional	\$200	\$179	11.7%	\$200	\$179	11.7%	\$179	\$179	-0.3%
Dental	\$354	\$277	27.8%	\$354	\$277	27.8%	\$316	\$277	14.1%
Home Health	\$271	\$145	86.9%	\$271	\$145	86.9%	\$250	\$145	72.4%
Drugs	\$849	\$757	12.2%	\$849	\$757	12.2%	\$849	\$757	12.2%
Durable Medical Equipment (DME)	\$78	\$79	-1.3%	\$78	\$79	-1.3%	\$78	\$79	-1.3%
Nursing Home	\$641	\$392	63.5%	\$641	\$392	63.5%	\$594	\$392	51.6%
Other	\$254	\$181	40.3%	\$254	\$181	40.3%	\$254	\$181	30.3%

## Notes:

a Non-patient revenue includes research grants, investment income, and other non-patient revenue sources.

b Based on Medicare geographic wage index and Geographic Adjustment Factor (GAF) applied to labor portion of spending by category

c Other professional services include services provided in facilities operated by medical providers other than physicians and dentists such as private-duty nurses, chiropractors, podiatrists, optometrists, and physical, occupational and speech therapists.

d Other personal health care services include: medical care provided to employees at work sites; medical care provided in non-traditional provider sites such as schools, military sites, and community centers; and home and community-based services through Medicaid.

Source: National Health Expenditure Accounts, Centers for Medicare and Medicaid Services, 2004.

## Greater Long-Term Care Spending Per Capita in Massachusetts

Home health and nursing home care services in Massachusetts generate much higher spending than the national average. Adjusted per capita spending on home health care services in Massachusetts is 72.4 percent higher than the U.S. and adjusted per capita spending on nursing home services in Massachusetts is 51.6 percent higher than the U.S. average. The higher spending on long-term care services is due partly to higher utilization and partly to payment levels that are higher than national average. However, Massachusetts citizens are only slightly older than residents of other states. Its residents' median age is 1.8 years higher than that of the US median age. In Massachusetts, 13.3% of the population is 65 years old or older and 2.2% of the population is 85 years or older, as compared to 12.6% and 1.8%, for the US, respectively.<sup>29</sup>

In 2007, Massachusetts had nearly 25 percent higher nursing home utilization than the nation. There were 320 nursing home residents per 1,000 population who were 85 years and older in Massachusetts compared to 259 per 1,000 in the U.S.<sup>30</sup> In addition, use of Medicare home health services by Massachusetts residents was among the highest in the country in 2001, with 57 users per 1,000 population in Massachusetts, fifty percent higher than the national average of 38 users per 1,000 population.<sup>31</sup>

In Massachusetts, like the rest of the U.S., the majority of nursing home care and home health services are funded by Medicaid. Relative to the U.S. average, Massachusetts offers more generous

long-term care benefits through its Medicaid program, MassHealth. The MassHealth program has implemented significant efforts to expand the availability and use of community based services.<sup>32</sup> While nursing home utilization in Massachusetts has decreased in recent years, spending has continued to increase due to mandated payment rate increases over time. In 2008, Massachusetts had the seventh highest Medicaid nursing home expenditures per capita at \$249.96, significantly higher than the U.S. average of \$161.23.<sup>33</sup> In 2007, MassHealth nursing home rates were 23 percent higher than the national average.<sup>34</sup>

## Greater Hospital Spending Per Capita in Massachusetts

The 18.5 percent difference in hospital spending in Massachusetts compared to the U.S. reflects, in part, higher hospital use, particularly outpatient and emergency department use (see Table B).

**Table B: Hospital Use in Massachusetts Is Higher than U.S. Average, Particularly Outpatient Hospital Care, 2007**

	Utilization per 1,000 population		
	Massachusetts	U.S.	MA/U.S. difference
Inpatient			
Beds	2.5	2.7	-7.40%
Inpatient days	688.5	657.3	4.70%
Admissions	129.7	118.4	9.50%
Average length of stay	5.3	5.6	-5.4
Outpatient			
Emergency dept visits	487.7	396.2	23.10%
Other hospital outpatient visits	2,548.40	1,610.60	58.20%

Note: These data include hospital admissions from out-of-state residents, so actual utilization rates limited to Massachusetts residents may be between 2 and 5 percent lower than those shown. These data represents hospital-based care only, and does not include the proportion of outpatient care that is provided in physician offices and other non-hospital outpatient settings. Comparative data is not available for use of non-hospital outpatient care.

Source: AHA Annual Survey<sup>35</sup>

Massachusetts residents use inpatient hospital care at a slightly higher rate than the U.S. average. However, use of hospital outpatient services in Massachusetts is nearly 60 percent higher than the U.S. average, and use of emergency departments is 23 percent higher. The higher use of both inpatient and outpatient hospital services in Massachusetts suggests that less expensive outpatient services may not be replacing more expensive inpatient care, but instead may reflect higher overall use of services.

One of the widely-accepted drivers of health care spending growth is technology—the development and spread of new diagnostic and treatment modalities. In 1995, Massachusetts was 40 percent below the national average for MRI units per million residents. By 2008, it is estimated that the state

had reached the national average.<sup>36</sup> Overall, in 2005, Massachusetts was the third highest state in percentage of hospitals offering many of the most commonly used high-tech services.<sup>37</sup>

According to a recent General Accounting Office (GAO) report, while Massachusetts Medicare physician services per population are higher than average for the U.S., no medical service area in Massachusetts was considered a “potentially overserved” area in terms of physician service utilization.<sup>38</sup> Moreover, when Medicare data are used to compare similar benefits across market areas, Boston Medicare beneficiaries do not use more health care services than those in other large cities. After adjusting for regional differences in wages, health status, special Medicare payments to hospitals and physicians, and regional differences in Part A and Part B enrollment rates, Boston service use per Medicare member is close to the U.S. average,<sup>39</sup> suggesting that patterns of care for the Medicare population are similar to the nation as a whole.

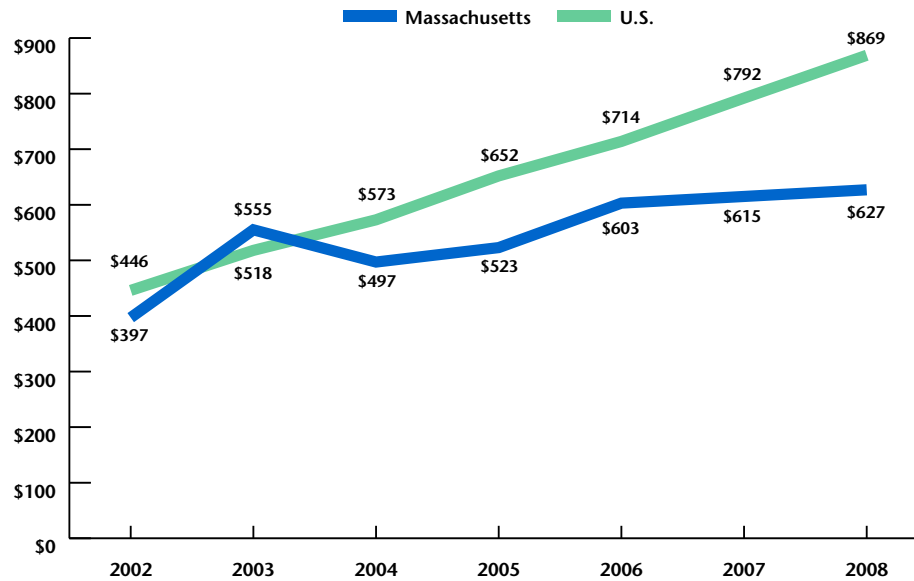
## Insurance Coverage

Massachusetts has the highest insurance rate in the country, with over 97 percent of residents covered compared to a national average of 85 percent.<sup>40,41</sup> Massachusetts is known for its commitment to broad health care coverage for its population, dedication of significant state revenue to subsidized coverage, a strong network of consumer advocates, and an extensive federal Medicaid 1115 waiver.<sup>42,43</sup> The widespread availability of health insurance improves access to care, increases use of health care services, and makes patients less sensitive to the price of care.<sup>44</sup> Having comprehensive insurance coverage that buffers the individual from the cost of a given health care service discourages members from considering cost-effectiveness when seeking services and choosing providers. This is likely to have an upward-pushing effect on total medical spending.

A greater proportion of Massachusetts residents are enrolled in health plans with more generous benefits than the national average.<sup>45,46</sup> As part of Massachusetts health reform, Massachusetts residents are required to have health insurance that meets criteria for “minimum creditable coverage” (MCC). Furthermore, while the proportion of U.S. residents who are underinsured has increased in recent years, the trend has moved in the opposite direction for Massachusetts. A recent study of underinsurance in Massachusetts, as measured by the level of out-of-pocket health care expenses, suggests that in 2007, among adults who were insured for the full year, the rate of underinsurance in Massachusetts was 6.1 percent compared to 19.8 percent in the U.S.<sup>47</sup>

The average individual deductible is an additional indicator of insurance benefit generosity. Between 2002 and 2008, the average individual deductible for employer-sponsored insurance in Massachusetts increased more slowly than the U.S. average (Figure 5). By 2008, individuals in Massachusetts, on average, faced 28 percent lower deductibles than the U.S. average. Typically, more generous benefits and less cost-sharing are associated with higher overall health spending due to increased use of health care services.<sup>48</sup>

**Figure 5: The Average Individual Deductible in Employer-Sponsored Plans in Massachusetts Has Risen More Slowly than in the U.S., 2002-2008**



Source: Agency for Healthcare Research and Quality, Center for Financing, Access and Cost Trends. Data for 2008 are estimated.

## The Structure of the Massachusetts Health Care System: Health Care Resources, Academic Medicine, and the Insurance Market

The Massachusetts health care system is characterized by a higher proportion per capita of physicians and other health care personnel. The state also experiences greater use of academic medical centers, which provide a significant percentage of inpatient and outpatient hospital-based care.

### Health Care Workforce

Massachusetts has the highest ratio of physicians to population in the nation, and higher ratios of other health personnel than the U.S. average (Figure 6 and Table C). However, actual differences between Massachusetts and the U.S. may be lower since a relatively high percentage of Massachusetts physicians may only provide patient care part-time while primarily participating in teaching and research.

**Table C: Massachusetts Has More Health Personnel per Capita than the U.S. Average**

Workforce personnel	Personnel per 1,000 population		
	Massachusetts	U.S.	MA/U.S. ratio
Non-federal Physicians <sup>a</sup>	5.28	3.30	1.60
Non-federal PCPs <sup>a</sup>	1.78	1.30	1.40
Non-federal Specialists <sup>d</sup>	3.50	2.00	1.80
Active Physicians <sup>b</sup>	4.28	2.70	1.60
Physicians in Patient Care <sup>b</sup>	3.90	2.53	1.50
Employed RNs <sup>c</sup>	1.18	0.83	1.40
RNs total <sup>a</sup>	1.23	0.84	1.50
Physicians Assistants <sup>a</sup>	0.27	0.24	1.10
Dentists <sup>a</sup>	1.10	0.80	1.40

Sources:

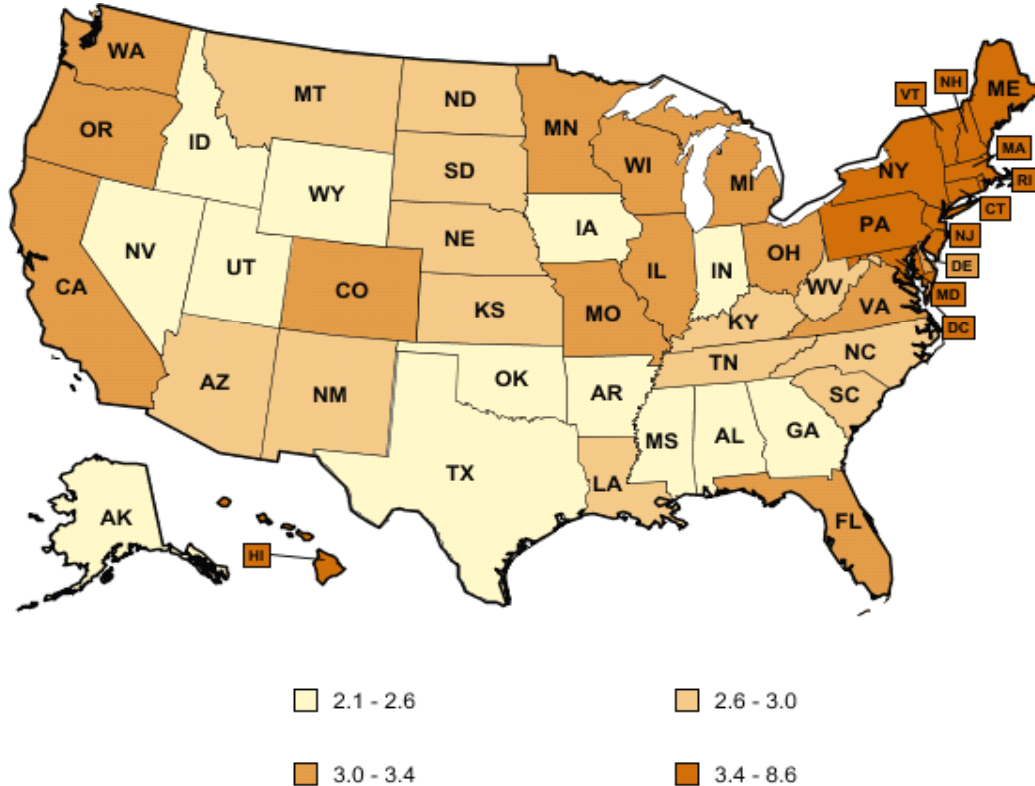
a Kaiser Family Foundation, StateHealthFacts.org, 2008.

b Health US, 2008. The rates shown are based on the year 2006.

c Health Resources and Services Administration. Results from the Health Workforce Survey, 2004.

d Kaiser Family Foundation, StateHealthFacts.org, 2008. Specialist calculations based on the difference between total Non-Federal physicians, and Total Non-federal PCPs.

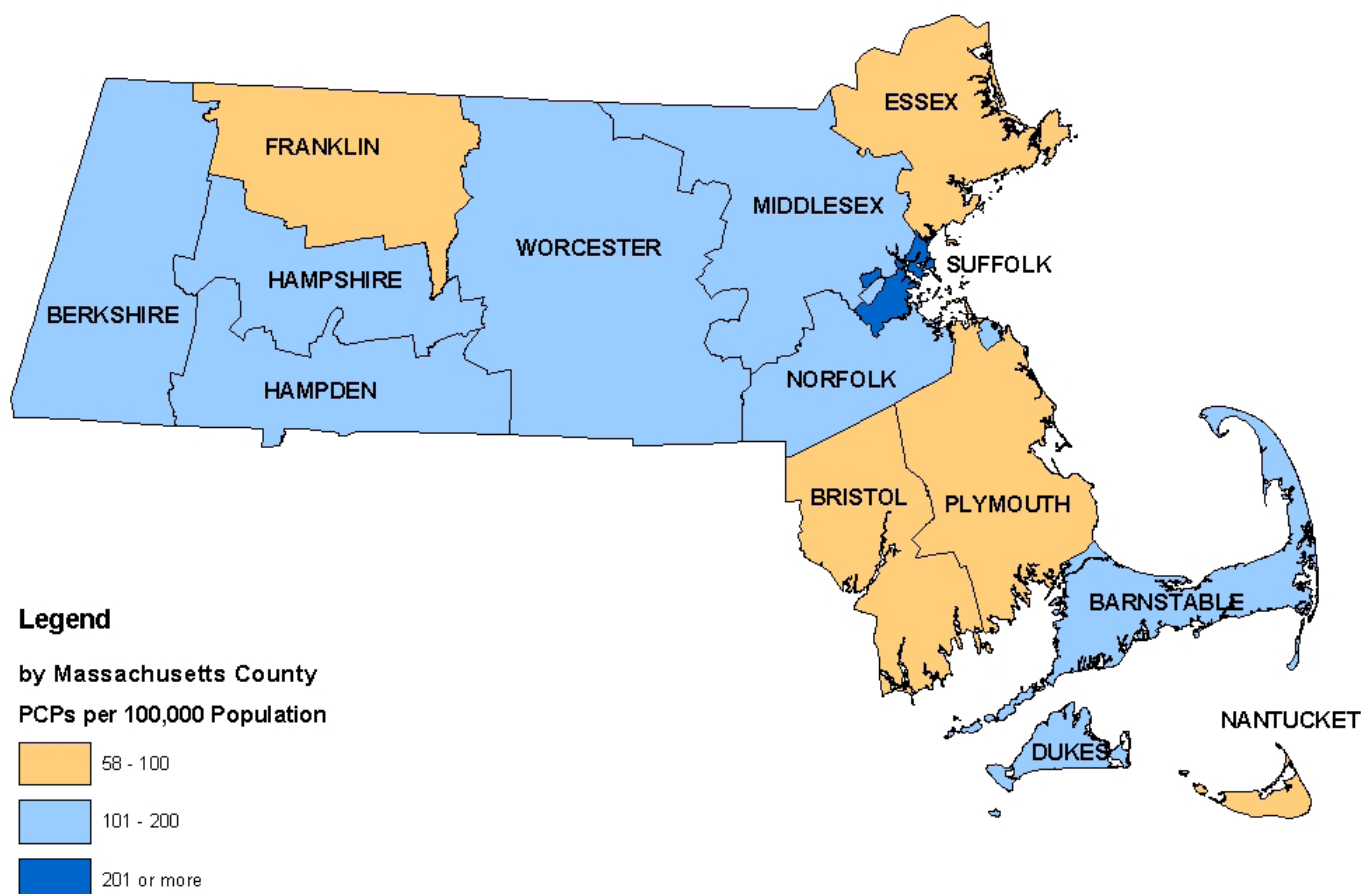
**Figure 6: Massachusetts Has a High Concentration of Physicians:  
Nonfederal Physicians per 1,000 population, 2008**



Source: [www.statehealthfacts.org](http://www.statehealthfacts.org)

Particularly, the number of specialist physicians per capita in Massachusetts is considerably higher when compared to the U.S. average. Massachusetts has 80 percent more non-federal specialists per capita than the U.S. A slightly smaller proportion of Massachusetts physicians practice primary care than in other states: approximately 34 percent of physicians in Massachusetts are primary care providers, compared to 39 percent nationally.<sup>49</sup> Most of these PCPs practice in the greater Boston area (see Figure 7).

**Figure 7: Primary Care Physician Density by County  
per 100,000 Population, 2006**



Source: Health Resources and Services Administration (HRSA). 2006 National Physician Inventory. Data are derived from the 2006 American Medical Association Physician Master File (AMA MF) and includes 20% Centers for Medicare and Medicaid Services (CMS) Medicare Part B and Outpatient claim data.

## Physician Affiliations

With the growing number of larger health systems, physicians must decide whether to affiliate with these systems, develop closer ties with smaller community hospitals, or both.<sup>50</sup> There are several advantages to physicians who choose to affiliate with larger health systems, such as access to electronic health records (EHR), streamlined billing systems, access to a wider referral base (particularly for specialists), and the potential for higher physician fee schedules.<sup>51</sup> Hospital systems have been able to increase their market share in part by expanding physician affiliations.<sup>52</sup> As larger hospital systems continue to play a dominant role in the state's health care landscape, it is likely that physicians in Massachusetts are increasingly affiliating with them to be able to reap the financial and operational benefits provided by such an arrangement.



## Behavioral Health Providers

Massachusetts has a higher than average workforce in the area of behavioral health. According to state profiles, Massachusetts had 28.8 psychiatrists, 67.3 psychologists, and 236.9 social workers per 100,000 population. In 2000, Massachusetts ranked first among states in psychiatrists per capita, third among states in psychologists per capita, and sixth among states in social workers per capita.<sup>53</sup> Also, as of 2008, only 0.7% of Massachusetts residents were estimated to be living in mental health professional shortage areas—the second lowest percentage in the nation. (Delaware has the lowest rate at 0%; the U.S. estimate is considerably higher at 18.7 percent.) In 2006, Massachusetts ranked 17th out of 50 states in mental health services expenditures per capita by state mental health agencies.<sup>54</sup>

## Academic Medicine

Academic medicine has a strong presence in the Massachusetts health care system. In 2006, 46 percent of hospitals beds in Massachusetts were in academic medical centers, compared to 19 percent nationally.<sup>55</sup> As a proportion of all hospital admissions in Massachusetts, admissions to academic medical centers increased from 35 percent in 1993 to 45 percent in 2008, compared to the national average of 19 percent throughout the period. The increase occurred mostly during the 1990s, when a number of community hospitals in Massachusetts closed.<sup>56</sup> Consistent with this trend, a higher proportion of outpatient care in Massachusetts is also delivered in academic medical centers relative to the rest of the U.S.<sup>57</sup>

Research suggests that U.S. academic medical centers tend to provide high quality and more technologically-advanced services relative to community hospitals.<sup>58</sup> At the same time, the prevalence of academic medical centers in Massachusetts contributes to higher health care costs and cost growth in the state through more intensive treatments, more diagnostic services, and higher prices.<sup>59</sup>

Controlling for case mix, prices at academic medical centers are typically higher than community hospitals, attributable in part to the cost of teaching, research, and standby capacity for medically complex patients.<sup>60</sup> Historically, Medicare has made both graduate medical education (GME) and indirect medical education (IME) payments to cover the direct and indirect costs of teaching and research at these facilities. However, private payers may also bear these costs through higher negotiated payment rates with academic medical centers.<sup>61</sup> The higher cost of a Cesarean section delivery serves as an example of this difference. In 2007, the median cost of a Cesarean section delivery in Massachusetts academic medical centers (\$6,450) was approximately 14 percent higher than in non-academic medical centers (\$5,663).<sup>62</sup>

One measure of the influence of academic medicine is the role played by resident physicians. While the presence of medical residents enhances the capacity of hospitals to provide care, there are costs associated with their supervision and training. In 2005, Massachusetts had more than twice as many medical residents per capita compared to the U.S. average, with 78 medical residents per 100,000

people in the state, compared to 35 medical residents per 100,000 people in the U.S.<sup>63</sup> Furthermore, medical residents make up two-thirds of hospital-based physicians in Massachusetts, and 90 percent of these medical residents are located in the greater Boston area hospitals.<sup>64</sup>

Academic medical centers also account for a large proportion of spending on facility expansions and renovations in Massachusetts. A recent analysis of Determination of Need (DoN) approvals across the state—required when a capital expansion would exceed established expenditure minimums or for the introduction of new and innovative services—suggests that between 2000 and 2008, academic medical centers made up 68 percent of approved spending. Spending by academic medical centers was driven by expansion and renovation projects as they were more likely to add new square footage, while community hospitals were more likely to renovate existing square footage.<sup>65</sup>

The influence of academic medicine continues to expand as some health systems are affiliating with suburban community hospitals. Outpatient hospital facilities affiliated with academic medical centers have also opened in the suburbs.<sup>66</sup> As these providers become more concentrated, this further enhances their ability to negotiate higher prices and increases overall health care costs in the system.

## **Contribution of Academic Medicine to the State Economy**

Academic medicine in Massachusetts contributes significantly to the state economy, in particular through the strong presence of biotechnology firms in the Boston area. However, the funding for research and investments can spur the development and use of new medical findings and the expansion of medical facilities, increasing overall health care costs in the system.<sup>67</sup>

In 2007, the Association of American Medical Colleges (AAMC) estimated the total economic impact of its member medical schools and academic medical centers in 28 large states, based on direct impacts such as salaries, and indirect impacts such as goods and services purchased.<sup>68</sup> In 2007, the per capita economic activity generated by academic medicine in Massachusetts (\$4,522) was by far the highest among the 28 states studied, and was about 2.8 times a 28-state average.<sup>69</sup>

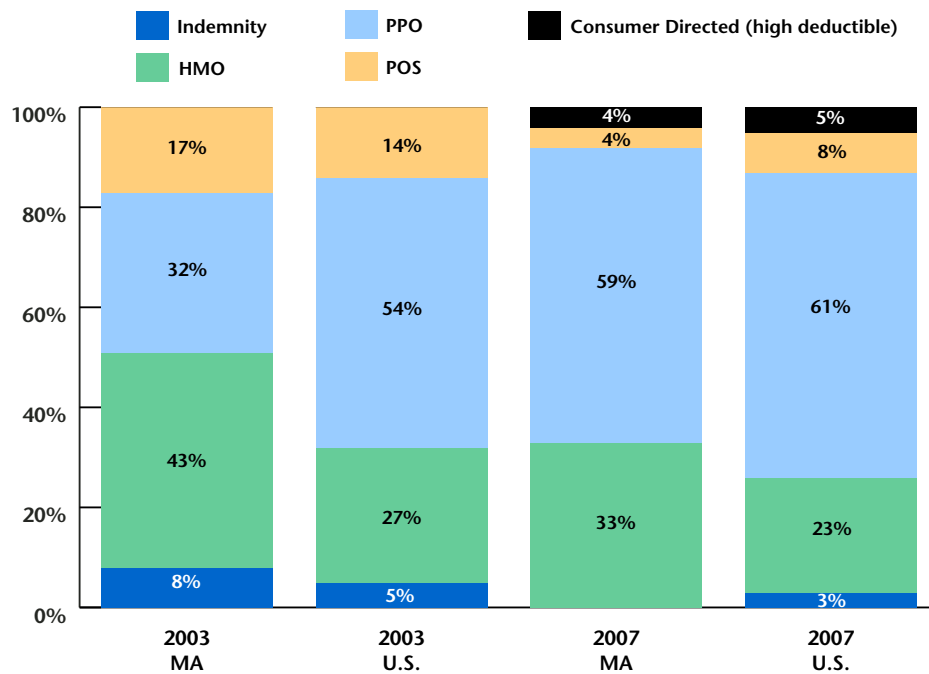
Due to the presence of research and academic medical centers, Massachusetts receives far more National Institutes for Health (NIH) research funding per capita than any other state. In 2008, Massachusetts received \$347 in per capita NIH funding in comparison to \$68 for the remainder of the U.S.<sup>70</sup> These grants support the state's health care workforce, foster economic and academic productivity, and contribute to the advancement of clinical science through research and technological innovation. According to the NIH Division of Research Grants, the five independent hospitals in the nation that received the most NIH research funding in fiscal 2005 (a combined \$883 million) were all located in the city of Boston including: Massachusetts General Hospital; Brigham & Women's Hospital; Beth Israel Deaconess Medical Center; Dana-Farber Cancer Institute; and Children's Hospital Boston.

## Structure of the Massachusetts Health Insurance Market

There are several different types of health insurance plans available in Massachusetts. The design of health insurance products has implications for provider payment methods, the extent to which risk for the cost of care is shared with providers, and overall health care costs. Some HMOs use limited networks and provider risk-sharing to control health care costs. In contrast, PPOs, which are less able to contain costs through limited networks, are the fastest growing type of health insurance in Massachusetts and the U.S. In 2007 the HMO penetration rate in Massachusetts was higher than the U.S. at 33 percent versus 23 percent nationally (Figure 8). However, in Massachusetts, the market share of PPOs increased from 32 percent in 2003 to 59 percent in 2007, similar to the 2007 U.S. average of 61 percent.

Since the late 1990s, HMOs nationwide have looked increasingly like PPOs.<sup>71</sup> In Massachusetts, plans labeled HMOs may use the same payment models as PPOs, including fee-for-service. Moreover, they may offer open provider networks and share little or no risk with providers.<sup>72</sup> For example, in Boston, several HMOs have broad provider networks, limited service restrictions, and fee-for-service payment methods.<sup>73</sup> However, while certain HMOs do shift some risk to providers, PPOs currently

**Figure 8: Enrollment in Employer-Sponsored Preferred Provider Organization (PPO) Health Plans Is Growing in Both Massachusetts and the U.S., 2003 to 2007**



Source: Massachusetts data from: A special analysis of Mercer's national survey of employer-sponsored health plans for the Massachusetts Division of Insurance, 2008. U.S. data from: Mercer's national survey of employer-sponsored health plans, 2007. Health plan definitions from the Mercer National Survey of Employer-Sponsored Health Plans<sup>74,75</sup>

do not. Since the type of health insurance plan does not necessarily determine how providers are paid, it is essential to look beyond plan labels to understand how performance risk is shifted to providers and the implications of risk-sharing on provider incentives and overall health care costs.

## **Insurance Market Segments**

The market for non-government funded health coverage is divided into three main categories: “fully-insured” employers, “self-insured” employers, and individuals directly purchasing their own coverage. Fully-insured employers purchase insured health coverage from licensed health insurance carriers, whereas self-insured employers bear the financial risk and pay for their employees’ and dependents’ covered health care expenses from their own resources, but may use a health insurance carrier as an administrator. A large and growing number of employers are self-funding their employee health benefits. In 2009, 51% of private group health coverage enrollment was self-insured groups, up from 45% in 2006.<sup>76</sup> Self-insured employer health coverage is not regulated by the Commonwealth, but rather is dictated by rules and obligations under federal law, specifically the Employee Retirement Income Security Act of 1974 (ERISA) which preempts any state regulation of self-insured health benefit plans. Such plans are not subject to any pricing or coverage regulations under the Massachusetts Division of Insurance (DOI), nor are they subject to state mandates regarding covered benefits. As such, state regulations are only able to influence pricing rules and coverage standards for 49% of employer-sponsored coverage. Recent data indicate that health care costs in the self-insured market are growing more rapidly than those in the fully-insured market. From 2007 to 2008, medical trend for self-insured plans was higher than that for all fully-insured plans, with self-insured experiencing a growth rate of 8.5 percent compared to 7.0 percent for fully-insured employers.<sup>77</sup>

The Massachusetts fully-insured group health insurance market includes the merged small group/nongroup group market (applicable to employers with 50 or fewer covered lives and individuals who purchase their own coverage) and large group market (those with more than 50 covered lives). The merged group market is heavily regulated through premium pricing rules that restrict the amount of variation that can exist between members of different ages and industries, and premiums are built off a base rate that includes the experience of the entire merged group market enrolled with a given health insurer. Large group premium pricing is not regulated in this way, and its premiums are more likely to be experience rated (i.e., premiums for a given year will reflect past years’ usage of the employer group’s members).

Because current state regulatory authority is only able to affect a portion of the insurance market, health care costs are, by default, more influenced by trends in medical spending than by regulation. For example, health insurers have the power to influence service utilization and selection of care settings through targeted incentives for providers, which can, in turn, affect overall health care spending trends and premium growth rates.

## Methods Used by Health Insurers to Pay Providers in Massachusetts

The methods used by health insurers to pay providers are a key factor in health care costs. Incentives influencing the volume, intensity, and quality of care can be implicit in the method of payment. For example, it is widely recognized that fee-for-service payment rewards providers for delivering greater, more costly services, but offers little incentive to improve quality or to offer patient-centered, coordinated care. Other payment methodologies that shift some risk to providers, such as “bundled” payments, reward providers for more efficient delivery of care.

### Survey of Payment Methods

This section investigates the methods that health insurers in Massachusetts currently use to pay hospitals, physicians, and post-acute care providers for health care services in their largest health plans. The data request was made in April 2009 and data were provided in June 2009, corresponding to the payment methods used by health insurers at the time data were reported. All health insurers were asked to provide information on forms of payment and payment incentives used in their largest commercial PPO and HMO products.<sup>78</sup> Health insurers that also offer Medicare or Medicaid products were asked to report the same information for those products. Results were obtained from a total of 13 health insurers: 12 of which offered commercial products, and eight of which offered public products (Medicare or Medicaid). When payment methods varied substantially between large and small health insurers, information is reported by size of health insurer for each product type.<sup>79</sup> The survey accounted for the number of health insurers that used a payment method, but not the volume of services paid by each method. Greater detail on the survey and results is provided in *Provider Payment: Trends and Methods in the Massachusetts Health Care System*.

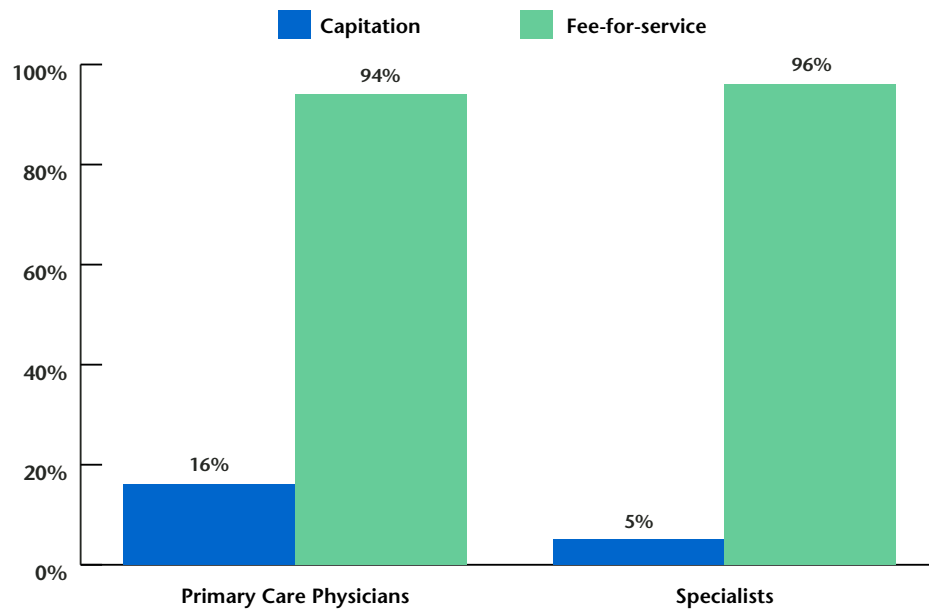
This section focuses on payment methods in HMO products, where risk-sharing or other innovative payment methods are most likely to be used. In Massachusetts, HMOs cover approximately 33 percent of all commercial members, 17 percent of Medicare beneficiaries, and 60 percent of Medicaid beneficiaries.<sup>80</sup> Nearly all other insured residents in the state are covered by commercial PPO products, or traditional, non-network Medicare or Medicaid programs, which rely on FFS payment arrangements. Therefore, the percentage of members who see providers with the risk-based arrangements described here reflects a limited share of the market.

### Physician Payment in Commercial Products

Commercial health insurers in Massachusetts reported using FFS as the most common payment method in their largest HMO and PPO products alike, for both primary care and specialist services. In PPO products, FFS was the only method of payment to physicians. In contrast, seven out of the 10 commercial health insurers that offered HMO products used capitation to pay some primary care physicians (PCPs), and half used capitation to pay a small number of specialists. In 2009, health insurers reported using FFS to pay 94 percent of primary care physicians and 96 percent of specialists

in their largest HMO products (Figure 9). This suggests that plan type (PPO vs. HMO) does not distinguish the type of payment method used to pay providers. Furthermore, the predominance of fee-for-service payment methods in the largest PPO and HMO products creates incentives to provide more health care services, regardless of their value.<sup>81</sup>

**Figure 9: Fee-for-Service Payments Are the Predominant Mode of Physician Payment by Massachusetts Commercial HMO Products for Health Insurers Using Any Capitation**



Note: Among the largest commercial products (both HMOs and PPOs), 7 out of 12 commercial health insurers use capitation to pay some PCPs, and 6 out of 12 use capitation to pay a small number of specialists. Each health insurer reported the percent of physicians they pay with each method in the following ranges: 1-9 percent; 10-49 percent; 50-79 percent; 80-99 percent; or 100 percent. The average percent of physicians paid with the method is calculated as the average of the midpoints of the ranges reported by health insurers that used the payment method. Total of payment methods does not add up to 100 percent as physicians may be paid using several methods.

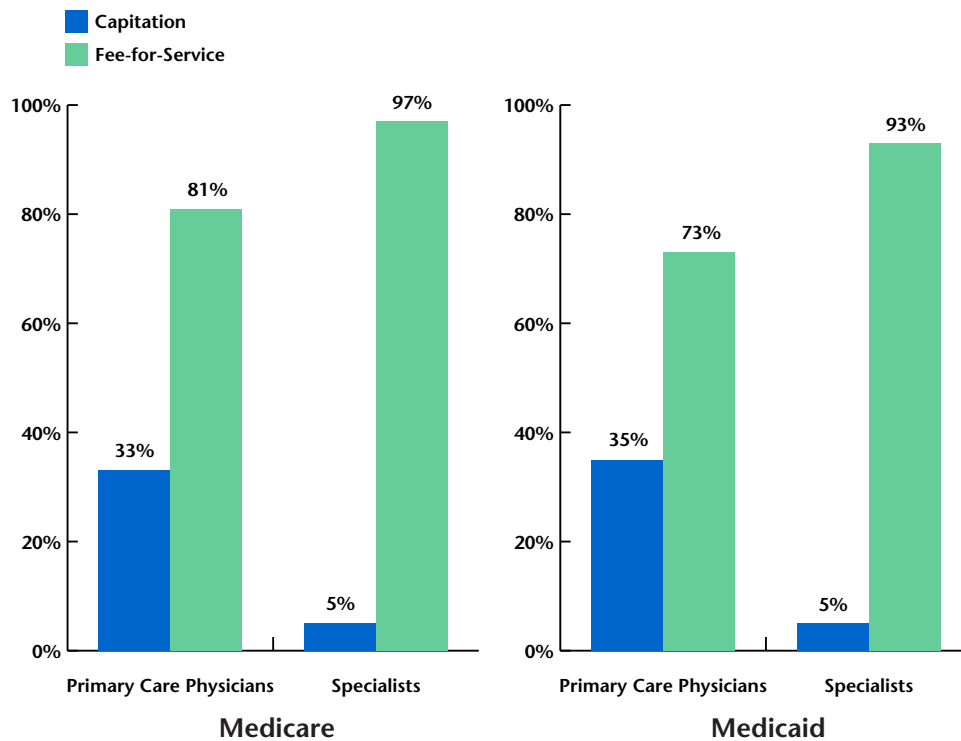
Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurers conducted for the Division of Health Care Finance and Policy, 2009

Some health insurers used more than one payment method for selected services, so that 16 percent of primary care physicians and 5 percent of specialists were paid capitation in their largest HMO plans. However, most large HMO carriers cover comprehensive services under capitation for at least some PCPs and include in the capitation rates the following services: primary care or other office-based services; ambulatory care provided outside of the office; inpatient visits; ancillary care; and referrals to specialty care. Just over half of the commercial HMO carriers adjusted PCP payments (either FFS or capitation) using performance measures and nearly half of the plans adjust payments based on quality measures as well as utilization or cost measures.

## Medicare and Medicaid

Four out of eight health insurers that reported public sector products (Medicare or Medicaid) used capitation for at least some physicians. About one-third of primary care providers (PCPs) in public-sector products were covered under capitation arrangements, much higher than the 16 percent in commercial HMO products (Figure 10).

**Figure 10: Capitation is a More Common Payment Method for Primary Care Physicians in Public Sector Products (Medicare and Medicaid) Among Health Insurers Using Any Capitation**



Note: Total of payment methods does not add up to 100 percent as physicians may be paid using several methods.

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurers conducted for the Division of Health Care Finance and Policy, 2009

## Hospital Services

Health insurers use a variety of methods to pay for hospital inpatient and outpatient services, reflecting their different arrangements with hospitals or hospital systems.

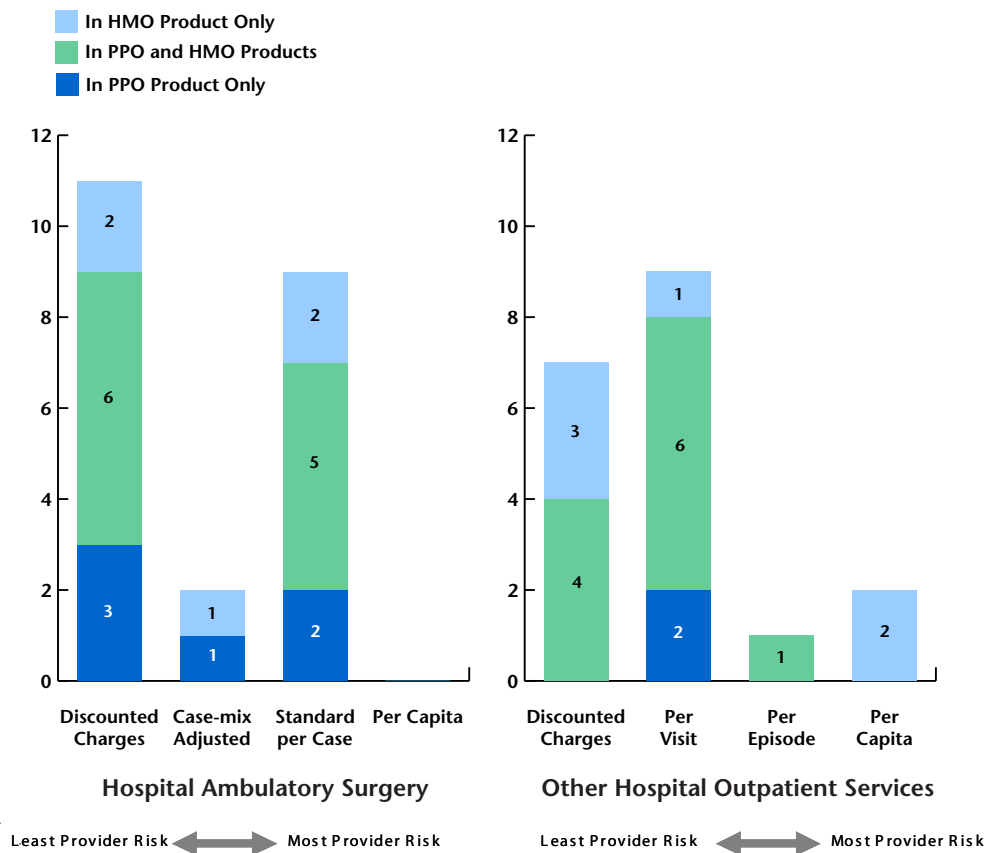
For inpatient services, most health insurers used several methods to pay for inpatient services in their largest commercial products (most often diagnosis-related groups (DRGs) [11 out of 12 health insurers] or per diem payments [11 out of 12]). Most health insurers (10 out of 12) paid for at least some hospitalizations with discounted charges in their largest commercial products. Only two



health insurers paid hospitals on a per capita basis in their commercial products (and only for their largest HMO products).

For hospital outpatient services, most health insurers used payment methods that shared little or no risk with hospitals (Figure 11). For hospital outpatient services, most health insurers used a mix of discounted charges and per case (for ambulatory surgery) or per visit (for other outpatient services) payments in their largest commercial products. Such arrangements indicate limited incentives to manage volume in the outpatient setting.

**Figure 11: Health Insurers Share Little Risk with Hospitals in Payment Methods for Outpatient Hospital Services in their Largest Commercial PPO and HMO Products, 2009**



Note: Case mix adjusted is defined as payments adjusted for patient severity. Standard per case defined as payments for a service, not adjusted for patient severity. Health insurers may use more than one method to pay for services.

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurers conducted for the Division of Health Care Finance and Policy, 2009.

## Risk Contracts in Commercial and Public Sector Products

Nationally, health insurers sometimes share risk with providers through contracts that are negotiated with intermediate entities such as medical groups, independent practice associations



(IPAs), or physician-hospital organizations (PHOs). These risk contracts may specify capitation, partial capitation, or global budgets for some or all services. Alternatively, they may specify FFS with withholds or bonuses for meeting or approaching use and/or cost targets. None of the Massachusetts health insurers reported using risk contracts in their largest PPO products, and only six of the 10 commercial HMO health insurers reported sharing risk with intermediate entities in their largest HMO products (Table D).

The lack of risk-sharing between health insurers and medical groups, IPAs, and PHOs suggests that these provider organizations receive little financial incentive to focus on preventive medicine and overall medical outcomes through improving the quality of care, increasing coordination of care, or providing care in the appropriate setting.

**Table D: Approximately Half of HMO Health Insurers Have Risk Contracts in Public and Private HMO Products**

	All HMO Carriers	Large HMO Carriers <sup>1</sup>	All carriers with public products	Largest Medicare product	Largest Medicaid product
<b>Total number of carriers</b>	10	5	8	6	3
<b>Carriers that have risk contracts with medical groups, IPAs, or PHOs</b>	6	4	4	3	2
Number of carriers sharing global risk	6	4	4	3	2
Number of carriers sharing professional risk	3	3	1	1	0
Number of carriers sharing hospital risk	2	2	1	1	0
<b>Among carriers with risk contracts, average percent of providers paid through risk-contracting entities:<sup>2</sup></b>					
Primary care physicians	8.3%	11.4%	--	22.5%	38.0%
Specialists	4.6%	6.7%	--	16.3%	4.5%
Hospitals	2.0%	3.0%	--	10.8%	0.0%
<b>Among carriers with risk contracts, average percent of:</b>					
Total lives covered under risk-contracting arrangements <sup>2</sup>	19.7%	21.9%	--	64.7%	56.0%
Premiums paid under risk-contracting arrangements <sup>2</sup>	16.8%	18.2%	--	64.5%	55.2%

Note: Each carrier reported risk contracts used by its largest HMO/Medicare/Medicaid plan.

<sup>1</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, were included in the "small carriers" category.

<sup>2</sup> Percentage of providers, covered lives, and premiums paid through risk-contracting entities are calculated only for carriers and products that reported some risk-sharing. The percentages are calculated by weighting each carrier equally.

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurers conducted for the Division of Health Care Finance and Policy, 2009.

- Four out of eight health insurers with public products had risk contracts with intermediate entities.
- Global risk-sharing (risk contracts that included all services including inpatient and outpatient services) is more common than risk contracts covering only physician or only hospital services among private and public product health insurers.

- While most health insurers with large commercial HMO products share risk with intermediate entities, those risk contracts involve relatively few providers or patients.
- Members in health insurers' largest Medicare and Medicaid products were more likely to be covered under risk contracts than members in the largest commercial HMO products.

## Innovative Payment Methods

Several payers in Massachusetts and nationally have adopted pay-for-performance (P4P) and other innovative payment models that combine quality or efficiency incentives with their basic method of payment.<sup>82</sup> P4P is an approach to payment that provides financial rewards to individual providers, provider groups, or institutions based on meeting or exceeding established quality or process of care measures.<sup>83</sup> Process of care measures address how clinical care is delivered based on guidelines for standard methods of care, such as prescribing aspirin following a heart attack upon hospital admission.<sup>84</sup> Nationally, research indicates that P4P programs generally reward processes rather than outcomes, and offer financial incentives that are too small to significantly change provider behavior.<sup>85</sup>

In Massachusetts, about half of both large and small health insurers use payment methods to encourage better quality or lower cost care in at least one of their largest products (PPO, HMO, Medicare, or Medicaid) (Table E).

**Table E: Larger Health Insurers are More Likely to Use Selected Innovative Payment Methods Relative to Smaller Health Insurers (N=13 health insurers total)**

	Small Carriers (N=7)	Large Carriers (N=6)
Payment incentives to encourage primary care	3	3
Episode-based or bundled payments	2	1
Payment for "medical home" services	0	2
P4P for inpatient hospital payments	0	3
P4P for outpatient hospital payments	0	3
P4P for intermediate entities	0	2

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Finance and Policy, 2009.

- Relatively few health insurers (2 out of 13) pay for "medical home" services in their largest commercial or public products. However, nearly half of all health insurers use other payment incentives to encourage and enhance the delivery of primary care services.

- About half of large health insurers used incentive payments to hospitals and/or intermediate entities in at least one product, but none of the small health insurers did. Most large health insurers tied these payments to process-of-care quality measures, although some large health insurers paid hospitals based on patient safety measures (data not shown).

## Conclusion

This report explored the factors that contribute to high health care costs in Massachusetts, including the structure of the health care system and the payment methods currently used by Massachusetts health insurers. Understanding these factors will better prepare the Commonwealth to evaluate and develop reforms that have the potential to simultaneously contain costs and improve quality.

As this report highlights, there are particular areas of opportunity for cost mitigation that the Commonwealth should consider in both the short and longer term:

- There is considerable opportunity in Massachusetts for greater integration of care to achieve improved efficiency and higher quality. The predominance of the fee-for-service payment methodology in both HMOs and PPOs creates limited incentives to ensure effectiveness, coordination, or value of provided services. A small number of providers are currently paid through risk-sharing arrangements. By bundling payments for both primary care physicians and for episodes of care, providers are encouraged to increase their coordination and communication with each other. Those delivery systems that choose to employ global payment or similar risk-sharing and coordinated payment strategies should be rewarded for such efforts.
- Health plans with open networks dominate the Massachusetts insurance landscape. These arrangements allow providers to have more leverage in negotiating payment rates. At present, Massachusetts has few insurance products that limit and coordinate choice of providers, in part because the market demands widespread access to providers. The growing use in Massachusetts of high cost providers for care, a result of open networks, has contributed to higher costs of care. In order for more selective and coordinated markets to be successful, employers as well as employees should understand the value of receiving care at less expensive but equally capable providers, and the long-term consequences to their economic well-being if health care costs are not brought under control.
- Massachusetts' residents now experience lower cost-sharing than their counterparts in the rest of the country. This suggests that there may be an opportunity to develop benefit plans and products that carefully utilize a balanced cost-sharing approach designed to encourage consumer awareness of health care prices and how their decisions may impact health care costs, without burdening consumers or employers. As such, greater transparency and consumer education in provider pricing and quality is needed so that patients can best interpret such data accordingly and make more informed decisions.
- Massachusetts has higher spending than the nation for outpatient hospital care. These facilities provide a wide range of services that can be delivered in physician offices. The growing number of these facilities and increasing range of services provided in hospital outpatient settings suggest that incentives need to be aligned to encourage the right care in the right place at a lower cost.

- Physicians play a major role in determining what services are provided and where. They are choosing to provide more care in outpatient hospital settings, ranging from evaluation and management to imaging and procedures. Because physicians incur staff and equipment costs as well as administrative burden when care is provided in their offices, physicians may have a financial incentive to provide care in these higher-cost facilities. There is opportunity to re-balance payments so that more professional services will be provided in less expensive settings, such as physician offices in community-based settings.
- Over the past decade, the footprint of major academic medical centers in Massachusetts has increased both in terms of the geographic area served and scope of services provided. In recent years, the Commonwealth has taken a number of significant steps to place controls on unnecessary expansion. Support for these and additional regulatory mechanisms are necessary to limit duplicative and overlapping services. Maintaining our national leadership position in health care research requires the state's teaching institutions to remain strong. However, the increasing share of patient care services provided in academic medical centers is a considerable cost driver and provides an opportunity for cost savings.

A comprehensive cost containment program must encourage the development of health systems that deliver coordinated, efficient and high quality care to their patients across the Commonwealth and must take steps to address the market irregularities and imbalances that exist today. Developing the overall market conditions for providers and health insurers to compete on the basis of cost and quality—not utilization—will require action by employers, consumers and government, as well as a careful transition to a health care delivery system that aligns financial incentives with better health care outcomes.

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For the purposes of this report, "economic impact" includes both the direct and indirect business volume generated by an institution. Direct impact includes items such as institutional spending, employee spending, and spending by patients and visitors outside of AAMC-member institutions. Spending by patients and visitors at AAMC-member institutions is not included in the impacts listed in this report. The indirect impact, also known as the multiplier effect, results from the re-spending of dollars generated directly by the institution.
- <sup>70</sup>U.S. Department of Health and Human Services. NIH Research Portfolio Online Reporting Tool. ([http://report.nih.gov/award/trends/State\\_Congressional/StateOverview.cfm](http://report.nih.gov/award/trends/State_Congressional/StateOverview.cfm))
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- <sup>75</sup>Definitions:
- Health maintenance organizations (HMOs)** use a network of health care providers and do not cover care provided outside of the network.
- Preferred provider organizations (PPOs)** provide incentives for members to use network providers, but members are covered for care received outside the network.
- Point of service (POS) plans** use a network of providers and require participants to get a referral from a primary care physician (gatekeeper) before using specialists or hospital services; a lower level of coverage is provided for care received outside the network.
- A consumer-directed health plan (CDHP)** is a medical benefit design in which employees use spending accounts to purchase routine health care services directly. Non-routine expenses are covered by traditional insurance after members meet a generally high deductible. These plans are often combined with Health Savings Accounts (HSAs) or Health Reimbursement Arrangements (HRAs).
- A Traditional indemnity plan** is a medical benefit design in which the individual pays a premium to the insurer, the individual pays the provider for services rendered, and the insurer reimburses the individual.
- <sup>76</sup>*Health Care in Massachusetts: Key Indicators*. Boston: Massachusetts Division of Health Care Finance and Policy. Available at: [www.mass.gov/dhcfp](http://www.mass.gov/dhcfp)



<sup>77</sup>Massachusetts Health Care Cost Trends Part III: Privately Insured Medical Claims Expenditures 2006-2008. Boston: Massachusetts Division of Health Care Finance and Policy. Available at: [www.mass.gov/dhcfp](http://www.mass.gov/dhcfp).

<sup>78</sup>Note that health insurers self-defined HMO and PPO products for the purpose of this survey. In Massachusetts, companies that are regulated as HMO companies may write PPO products. HMOs are regulated under Chapter 176G of the Massachusetts General Laws.

<sup>79</sup>When referring to specific product types (e.g. commercial HMO or PPO products), results are based on health insurers' responses about the largest product offered. Health insurers are classified as large or small in the PPO and HMO markets separately (e.g., a health insurer might be classified as large in the PPO market but small in the HMO market). The four health insurers with the largest PPO enrollment in December 2008 (including both self- and fully-insured members) represented 90 percent of total PPO enrollment; these health insurers are included in the "large PPO health insurers" category. Similarly, the five health insurers with the largest HMO enrollment in 2008 represented 90 percent of total HMO enrollment and are included in the "large HMO health insurers" category. All other health insurers are included in the "small PPO health insurers" and "small HMO health insurers" categories, respectively.

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<sup>81</sup>Medicare Payment Advisory Commission. (March 2009). *Report to the Congress: Medicare payment policy*. Washington, D.C.: Medicare Payment Advisory Commission.

<sup>82</sup>The survey captured P4P payment adjustments only when health insurers contracted directly with physicians. Some health insurers contract with physician groups or other provider organizations, and those intermediate entities may use P4P incentives that were not identified.

<sup>83</sup>Mathematica. (2009). Summary: Pay for performance. Retrieved from [http://www.mass.gov/Eeohhs2/docs/dhcfp/pc/2009\\_02\\_13\\_Pay%20For%20Performance-C3.pdf](http://www.mass.gov/Eeohhs2/docs/dhcfp/pc/2009_02_13_Pay%20For%20Performance-C3.pdf)

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## Appendix: Method for Adjusting CMS State per Capita Health Spending Estimate

### Adjustment for Non-Patient Expenditures

- CMS state and national health spending estimates for hospitals are based on total hospital revenue reported by the AHA annual survey. We adjusted the CMS data for hospital spending by subtracting non-patient revenue reported on the survey. Therefore the adjusted hospital spending estimates reflect revenue from patient care services but not research, investment income, or other non-patient care activities.

### Adjustment for Area Wage Differences

- For hospitals, nursing homes, and home health care the adjustment was based on the 2006 Medicare geographic wage index (reflecting 2004 data). We calculated a discharge-weighted average statewide wage index for Massachusetts and applied it to the labor portion of spending for each provider (50% for hospitals, 70% for nursing homes, 75% for home health agencies). We estimated the hospital percentage based on AHA survey data which is lower than Medicare's statutory labor percentage for payment - resulting in a smaller adjustment. The labor percentage for nursing home and home health is based on Medicare's statutory percentage.
- For physicians, dentists, and other professionals the adjustment is based on Medicare's geographic adjustment factor (GAF) for physician services based on its geographic practice cost index (GPCI). The index reflects geographic differences in physician work, practice expenses, and malpractice costs. We calculated a population-weighted statewide average index based on the GAF for Boston and for the rest of Massachusetts. We applied the index to 100 percent of applicable expenditures.
- For drugs, durable medical equipment, and other expenditures we did not make any wage adjustment.

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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.1b**

### **Provider Payment: Trends and Methods in the Massachusetts Health Care Systems**



# **Provider Payment: Trends and Methods in the Massachusetts Health Care System**

**Prepared by Allison Barrett and Timothy Lake,  
Mathematica Policy Research, Inc.**

**February 2010**



Deval L. Patrick, Governor  
Commonwealth of Massachusetts  
Timothy P. Murray  
Lieutenant Governor

JudyAnn Bigby, Secretary  
Executive Office of Health and Human Services  
David Morales, Commissioner  
Division of Health Care Finance and Policy

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## **Introduction**

The way providers are paid is a key factor in health care costs. Incentives to provide more care, more costly care, or better quality care can be implicit in the method of payment. For example, it is widely recognized that fee-for-service (FFS) payment implicitly rewards providers for delivering more care and more costly care, but offers no incentives to improve quality or to offer patient-centered, coordinated care.

In contrast, global payments, which pays providers a single fee for all or most services that the member requires during a contract period, rewards providers for appropriate care by allowing providers to keep the savings gained from decreasing unnecessary tests, preventable hospitalizations, or emergency room visits. Global payment may also offer incentives for care coordination, but only to the extent that care coordination helps to control cost. Like FFS, global payment offers limited incentives to improve quality or to maintain high quality.

Recognizing the shortcomings of either FFS or global payment in creating sufficiently strong incentives for quality and therefore high-value care, many payers in Massachusetts and nationally have adopted pay-for-performance (P4P) models that layer quality incentives on their basic method of payment. However, many P4P programs currently reward processes rather than outcomes, and offer financial incentives that are too small to significantly change provider behavior (Miller 2007). Consequently, achieving the right care at the right time in the appropriate setting remains a challenge.

In July 2009, the Massachusetts Special Commission on the Health Care Payment System issued recommendations to reform the health care payment system, replacing the predominantly FFS system with a global payment model that would include P4P with appropriate rewards for a range of quality of care measures (DHCFP 2009). The Special Commission noted that, while FFS payment currently predominates in Massachusetts, an estimated 20 percent of commercial physician payments are currently made in Massachusetts under some form of global payment (Bailit 2009).

This report investigates in greater detail the methods that carriers in Massachusetts currently use to pay hospitals, physicians, and post-acute care providers for services. All carriers were asked to provide information on forms of payment and payment incentives utilized in their commercial preferred provider organization (PPO) and health maintenance organization (HMO) products, respectively. Carriers that also offer Medicare or Medicaid products were asked to report the same information for those products. Information is reported by size of carrier for each product type when payment methods varied substantially between large and small carriers.<sup>1</sup>



## **Payment Methods In Commercial Products**

### **Primary Care Physicians and Specialists**

Fee for service (FFS) is the predominant method of payment in Massachusetts for both primary care and specialist services. Nevertheless, about half of all carriers have capitation arrangements with some physicians, and these capitation payments cover a comprehensive set of services.<sup>2</sup>

More than half of the carriers in Massachusetts use P4P incentives for physicians, with primary care physicians (PCPs) more likely to face payment adjustments than specialists.<sup>3</sup> Carriers are more likely to use P4P in their HMO products, and large carriers are more likely to use P4P than small carriers in both the PPO and HMO market.<sup>4</sup>

#### **Major Findings:**

- Every commercial carrier in Massachusetts used FFS to pay the majority of PCPs and specialists (Table 1). FFS was the only method used to pay physicians in carriers' PPO products, and on average was used to pay over 90 percent of physicians in carriers' HMO products.
- About half of all commercial carriers in Massachusetts also used capitation for some physicians in their HMO product. Seven of the 12 use capitation to pay PCPs while 6 used capitation to pay specialists. These carriers had capitation arrangements with an average of 16 percent of contracted PCPs and 5 percent of specialists in their HMO products.
- The seven carriers that used capitation in their HMO products covered a comprehensive set of services in the capitation payment, not only office-based primary care (Table 2). Every carrier included primary care office visits and other physician office-based services in the capitation amount. More than half also covered inpatient visits, ambulatory care provided outside the office, ancillary care provided by others, and referrals to specialty care in the capitation payment. All of the large HMO carriers covered all of the non-office-based services, while less than half of the small HMO carriers did.
- Seven of the 12 carriers used P4P incentives, adjusting PCP payments (either FFS or capitation) for performance against various measures of quality and utilization or cost (Table 3). P4P payments were more common in carriers' HMO products: 60 percent of the largest HMO products used P4P in paying PCPs, compared with 30 percent of the largest PPO products.
- Fewer carriers used P4P to adjust specialist payments. Only 4 of the 12 carriers used P4P for specialists' services in either their largest PPO or HMO product. As was the case for PCPs, carriers were more likely to use P4P for specialists in their HMO products: 40 percent of the largest HMO products used P4P in paying specialists, compared with 22 percent of the largest PPO products.

- Carriers with significant PPO or HMO market share were more likely to use P4P in those products than carriers with low market share. Four of the 5 large HMO carriers used P4P for PCPs, while only 2 of the 5 small HMO carriers did so. Similarly, half of the large PPO carriers used P4P for both PCPs and specialists, while just 1 of the 5 small PPO carriers used P4P for PCPs only.
- Carriers used similar criteria to adjust payments for both PCPs and specialists. Most carriers using P4P adjusted payments to both based on quality and utilization or cost measures. Fewer than half of the carriers used consumer surveys of patients, measures of provider productivity, and the physician's use of electronic medical records or health IT. One carrier adjusted PCP payments based on patient complaints or grievances, but none of the carriers used that measure to adjust specialist payments.

## **Risk Contracts with Intermediate Entities**

Half of the carriers in the state contract on a risk basis with one or more intermediate entities such as medical groups, independent practice associations (IPAs), or physician-hospital organizations (PHOs). However, carriers use risk contracts only in their HMO products. While large HMO carriers more likely than small HMO carriers to use risk contracts, they currently involve relatively few providers or patients.

### **Major Findings:**

- Six of the twelve carriers contracted on a risk basis with intermediate entities in their largest HMO product (Table 4). Five of these six carriers also offered PPO products, but none of them used risk contracts in their PPO products.
- All of the six carriers that shared risk with intermediate entities used global contracts, sharing both hospital and professional (non-hospital) risk. Three of the six also had contracts with some intermediate entities sharing only professional risk, while two had contracts that shared only hospital risk.
- Large HMO carriers were more likely than small carriers to use risk contracts with intermediate entities. Four of the five large carriers had risk contracts with intermediate entities, compared with two of the five small carriers.
- On average, even large HMO carriers paid just 11 percent of PCPs, 7 percent of specialists, and 3 percent of hospitals through risk contracts with intermediate entities. Small HMO carriers covered even fewer providers under risk contracts, averaging 2 percent of PCPs and less than 1 percent of specialists.
- Nearly 22 percent of covered lives in large HMO carrier products were covered under risk-sharing arrangements with intermediate entities, accounting for 18 percent of premiums.

## Hospital Services

Every carrier uses several methods to pay for hospital inpatient and outpatient services, reflecting their different arrangements with different hospital or hospital systems. Most carriers use payment methods that share little or no risk with hospitals. However, very few carriers use payment methods that share full risk with hospitals—that is, both the risk of a hospitalization and any rehospitalization, and the risk associated with cost per stay.<sup>5</sup>

### Major Findings:

- The most common methods of payment for inpatient hospital services were per diem and per diagnosis-related group (DRG), used by 11 of the 12 carriers (Figure 1). Under these payment arrangements, hospitals receive a set payment per day or per hospitalization and are financially at-risk for any costs above those set payments. Most carriers (10 of the 12) used discounted charges for at least some hospitalizations.
- Only two carriers paid any hospitals on a per capita basis (a set fee per member month regardless of actual hospital utilization), and both did so only in their HMO products.
- For hospital outpatient services, most carriers used a mix of discounted charges and per case (for ambulatory surgery) or per visit (for other outpatient services) payments (Figure 2). Only two carriers used per capita payments for non-ambulatory-surgery outpatient services, and both did so only in their HMO products.

## Post-Acute Care Services

Most carriers use payment methods for post-acute care that share some risk with providers, but almost none share significant risk.

### Major Findings:

- All carriers paid skilled nursing facilities on a per diem basis (Figure 3). Seven of the 12 paid discounted charges for at least some stays, and one paid per DRG. No carrier paid for skilled nursing care on a per capita basis.
- All carriers paid for home health services on a per-visit basis; seven also use discounted charges for at least some providers or some services. No carrier paid per episode or per capita for home health services.

## **Payment Methods In Public-Sector Products**

For the most part, carriers use substantially the same payment methods in their public products as their commercial products. However, they make greater use of both capitation payments to physicians and risk contracts with intermediate entities.

### **Major Findings:**

- As was the case for commercial products, about half of the carriers that offered public products pay capitation to physicians: 4 of the 8 carriers with public products had capitation arrangements with PCPs, and 3 paid capitation to specialists as well (Table 5). However, the average percentage of PCPs covered under capitation arrangements was much higher in public plans (approximately 33 percent compared to 16 percent in commercial HMO products). The average percentage of specialists covered under capitation was the same (5 percent) in commercial HMO, Medicare, and Medicaid products.
- Carriers used risk contracts with intermediate entities in their Medicare and Medicaid products, as in their HMO products. Four of the 8 carriers used risk contracts in their public products; global risk contracts were more common than risk contracts that covered exclusively physician or hospital services (Table 6). However, compared with their HMO products, these contracts covered more providers and more lives: more than 20 percent of PCPs (compared with 8 percent in HMO products), and over 50 percent of covered lives (compared with 20 percent in HMO products).

## **Innovative Payment Methods**

About half of both large and small carriers use payment methods in at least one product (PPO, HMO, Medicare, or Medicaid) to explicitly encourage better quality or lower cost care. Among small carriers, the use of innovative payment methods is limited to individual physician providers, while large carriers also use innovative payment methods aimed at hospitals and intermediate entities.

### **Major Findings:**

- About half of both large and small carriers used payment incentives (other than medical home payments) to encourage high quality primary care services (Figure 4). Most often, these were bonus payments to physicians for use of technology or meeting quality standards.
- Three carriers used either some form of episode-based or bundled payments (other than DRG payments) for either inpatient or ambulatory care. Similarly, just two large carriers (and none of the small carriers) paid PCPs to support medical homes.
- About half of large carriers used P4P payments to hospitals and/or intermediate entities in at least one product, but none of the small carriers did. Most large carriers tied these payments to process-of-care quality measures, although some large carriers paid hospitals based on patient safety measures (data not shown).

## Endnotes

- <sup>1</sup> When referring to specific product types (e.g., commercial HMO or PPO products), results are based on carriers' responses about the largest product offered. Carriers are classified as large or small in the PPO and HMO markets separately (e.g., a carrier might be classified as large in the PPO market but small in the HMO market). The four carriers with the largest PPO enrollment in December 2008 (including both self- and fully-insured members) represented 90 percent of total PPO enrollment; these carriers are included in the "large PPO carriers" category. Similarly, the five carriers with the largest HMO enrollment in 2008 represented 90 percent of total HMO enrollment and are included in the "large HMO carriers" category. All other carriers are included in the "small PPO carriers" and "small HMO carriers" categories, respectively.
- <sup>2</sup> Capitation is typically a fixed per member per month payment reflecting the actuarial expected health care cost of enrollees. Risk sharing includes capitation but may also include other arrangements such as partial capitation, global budgets, and fee-for-service with withholds or bonuses based on service use and cost performance compared with cost targets.
- <sup>3</sup> The survey captured P4P payment adjustments only when carriers contracted directly with physicians. Some carriers contract with physician groups or other provider organizations, and those intermediate entities may use P4P incentives that were not identified.
- <sup>4</sup> Note that carriers self-defined HMO and PPO products for the purpose of this survey. In Massachusetts, companies that are regulated as HMO companies may write PPO products. HMOs are regulated under Chapter 176G of the Massachusetts General Laws.
- <sup>5</sup> These payment methods are only for direct payments to hospitals, and exclude contracts with intermediate entities (covered in Table 4) that may share more risk with hospitals.

## **Tables and Figures**

Table 1. Number of Carriers Using Fee for Service or Capitation for Primary Care Physicians and Specialists in their Largest Commercial PPO or HMO Products, 2009

	Largest Commercial Products <sup>a</sup>	Largest Commercial PPO Products <sup>a</sup>		Largest Commercial HMO Products <sup>a</sup>	
	Total number of carriers using payment method	Number of PPO carriers using payment method	Average percent of physicians paid using method <sup>b</sup>	Number of HMO carriers using payment method	Average percent of physicians paid using method <sup>2</sup>
Total number of carriers	12	9	--	10	--
<b>Payment methods used for primary care physicians</b>					
Fee-for-service (FFS)	12	9	100%	10	94%
Capitation	7	0	--	7	16%
<b>Payment methods used for specialists</b>					
Fee-for-service (FFS)	12	9	100%	10	96%
Capitation	6	0	--	5	5%

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

Note: Dashes indicate that the category is not applicable.

<sup>a</sup> Each of the 13 responding carriers reported payment methods used by its largest PPO and/or HMO products. Carriers may use more than payment method for each product.

<sup>b</sup> Each carrier reported the percent of physicians they pay with each method, in the following ranges: 1-9%, 10-49%, 50-79%, 80-99%, or 100%. The average percent of physicians paid with the method is calculated as the average of the midpoints of the ranges reported by carriers that used the payment method. See Appendix Tables 1 and 2 for additional detail.



Table 2. Number of Carriers Using Capitation Payments to Primary Care Physicians in their Largest Commercial HMO Products by Type of Services Covered, 2009

	All HMO carriers	Large HMO Carriers <sup>a</sup>	Small HMO Carriers
Total number of carriers using capitation for primary care physicians <sup>b</sup>	7	4	3
Number of carriers using capitation payment that covers			
...primary care office visits	7	4	3
...other services provided in the physician's office	7	4	3
...inpatient visits	6	4	2
...ambulatory care provided outside of the office	5	4	1
...ancillary care provided by others	5	4	1
...referrals to specialty care	5	4	1

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

<sup>a</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, were included in the "small carriers" category.

<sup>b</sup> Each carrier reported payment methods used by its largest HMO product.

Table 3. Number of Carriers Using Selected Methods to Adjust Payment for Primary Care Physicians and Specialists in their Largest Commercial PPO or HMO Products, 2009

	Largest Commercial Products <sup>a</sup>						
	Largest Commercial PPO Products <sup>a</sup>				Largest Commercial HMO Products <sup>a</sup>		
	All Commercial Carriers	All PPO Carriers	Large PPO Carriers <sup>b</sup>	Small PPO Carriers	All HMO Carriers	Large HMO Carriers <sup>c</sup>	Small HMO Carriers
Total number of carriers	12	9	4	5	10	5	5
<b>Adjusting payments to primary care physicians</b>							
Number of carriers that use any method to adjust payment	7	3	2	1	6	4	2
Number of carriers that adjust payments using...							
Quality measures	6	2	2	0	6	4	2
Utilization or cost measures for provider's panel	5	2	2	0	5	4	1
Consumer survey of patients	2	1	1	0	2	2	0
Electronic medical records / Health IT	2	1	1	0	2	2	0
Provider productivity	1	1	1	0	1	1	0
Patient complaints and grievances	1	1	0	1	0	0	0
Enrollee turnover rates	0	0	0	0	0	0	0
<b>Adjusting payments to specialists</b>							
Number of carriers that use any method to adjust payment	4	2	2	0	4	3	1
Number of carriers that adjust payments using...							
Quality measures	4	2	2	0	4	3	1
Utilization or cost measures for provider's panel	3	2	2	0	3	3	0
Consumer survey of patients	2	1	1	0	2	2	0
Provider productivity	1	1	1	0	1	1	0
Electronic medical records / Health IT	1	1	1	0	1	1	0
Patient complaints and grievances	0	0	0	0	0	0	0
Enrollee turnover rates	0	0	0	0	0	0	0

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

<sup>a</sup> Each carrier reported the methods used in its largest PPO and largest HMO products to adjust FFS or capitation payments to physicians. Each plan may use more than one method.

<sup>b</sup> The four carriers with the largest PPO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total PPO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all PPO covered lives, were included in the "small carriers" category.

<sup>c</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, were included in the "small carriers" category.

Table 4. Number of Carriers Using Risk Contracts with Intermediate Entities in their Largest Commercial HMO Products, 2009<sup>a</sup>

	All HMO Carriers	Large HMO Carriers <sup>b</sup>	Small HMO Carriers <sup>b</sup>
Total number of carriers	10	5	5
Carriers that have risk contracts with medical groups, IPAs, or PHOs	6	4	2
Number of carriers sharing global risk	6	4	2
Number of carriers sharing professional risk	3	3	0
Number of carriers sharing hospital risk	2	2	0
Among carriers with risk contracts, average percent of providers paid through risk- contracting entities: <sup>c</sup>			
Primary care physicians	8.3%	11.4%	2.0%
Specialists	4.6%	6.7%	0.5%
Hospitals	2.0%	3.0%	0.0%
Among carriers with risk contracts, average percent of:			
Total lives covered under risk-contracting arrangements <sup>3</sup>	19.7%	21.9%	15.3%
Premiums paid under risk-contracting arrangements <sup>3</sup>	16.8%	18.2%	14.0%

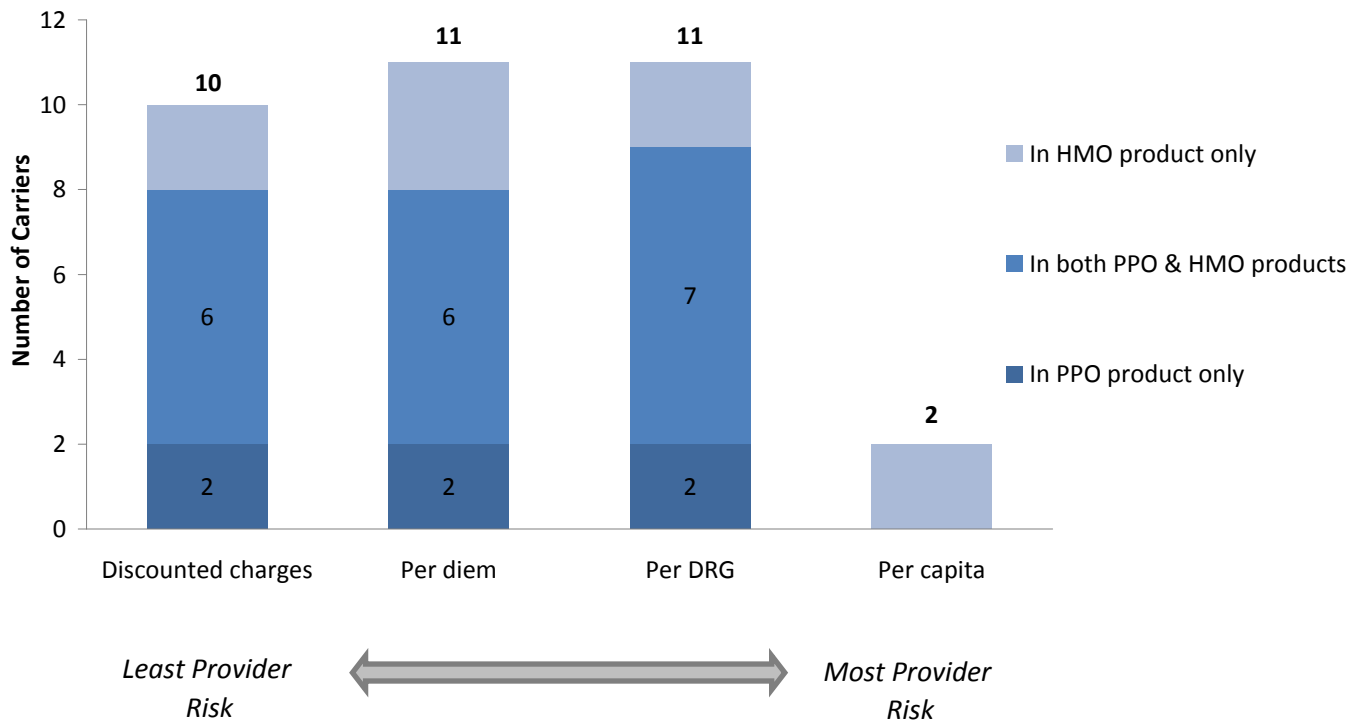
Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

<sup>a</sup> Each carrier reported risk contracts used by its largest HMO and largest PPO plan. None of the carriers reported using risk contracts in their largest PPO plans.

<sup>b</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, are included in the "small carriers" category.

<sup>c</sup> Percentage of providers, covered lives, and premiums paid through risk-contracting entities are calculated only for carriers and products that reported some risk-sharing. The percentages are calculated by weighting each carrier equally.

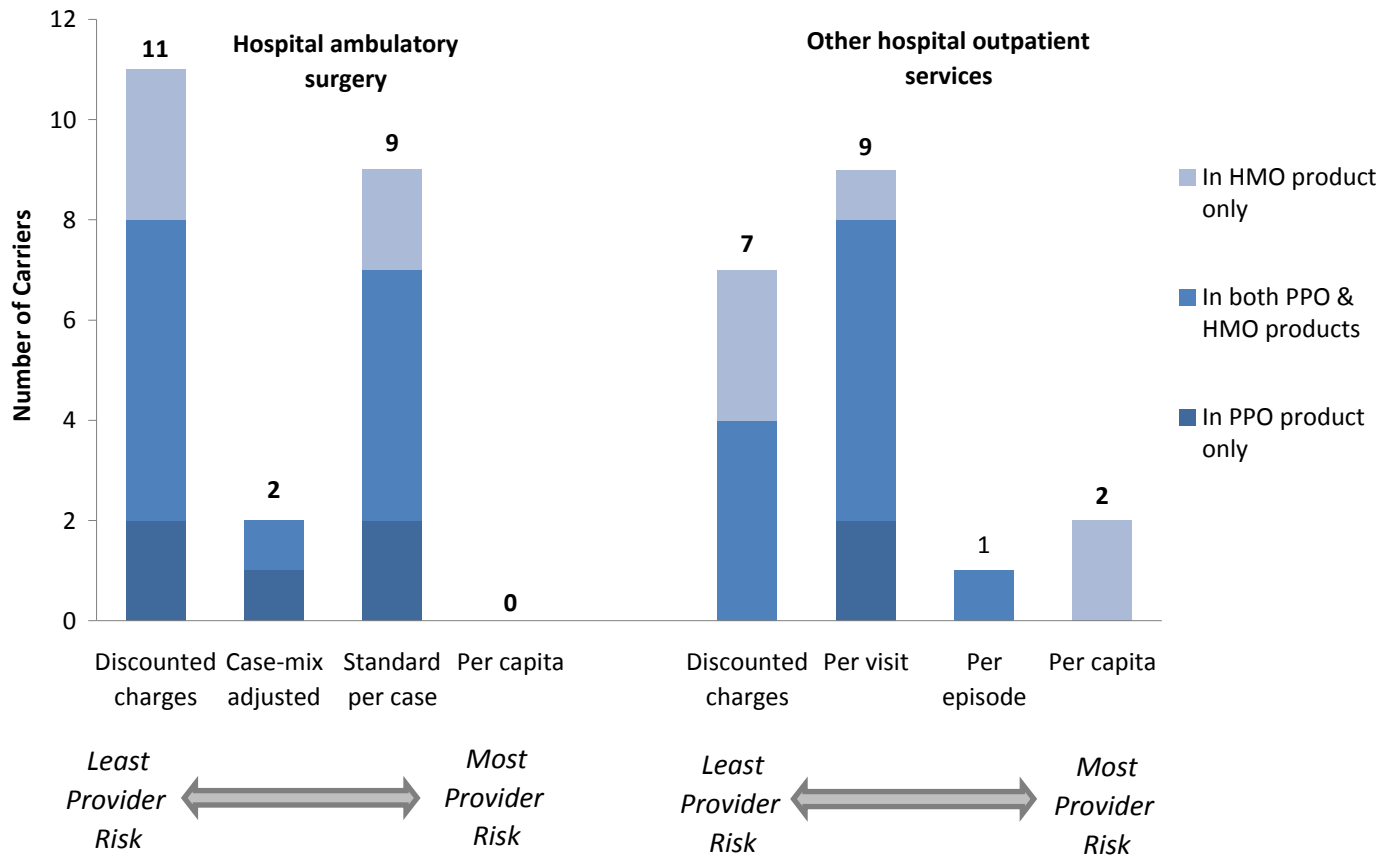
**Figure 1: Number of Carriers Using Selected Payment Methods for Inpatient Hospital Services in their Largest Commercial PPO or HMO Products, 2009**



Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

Note: Carriers may use more than one method to pay for services.

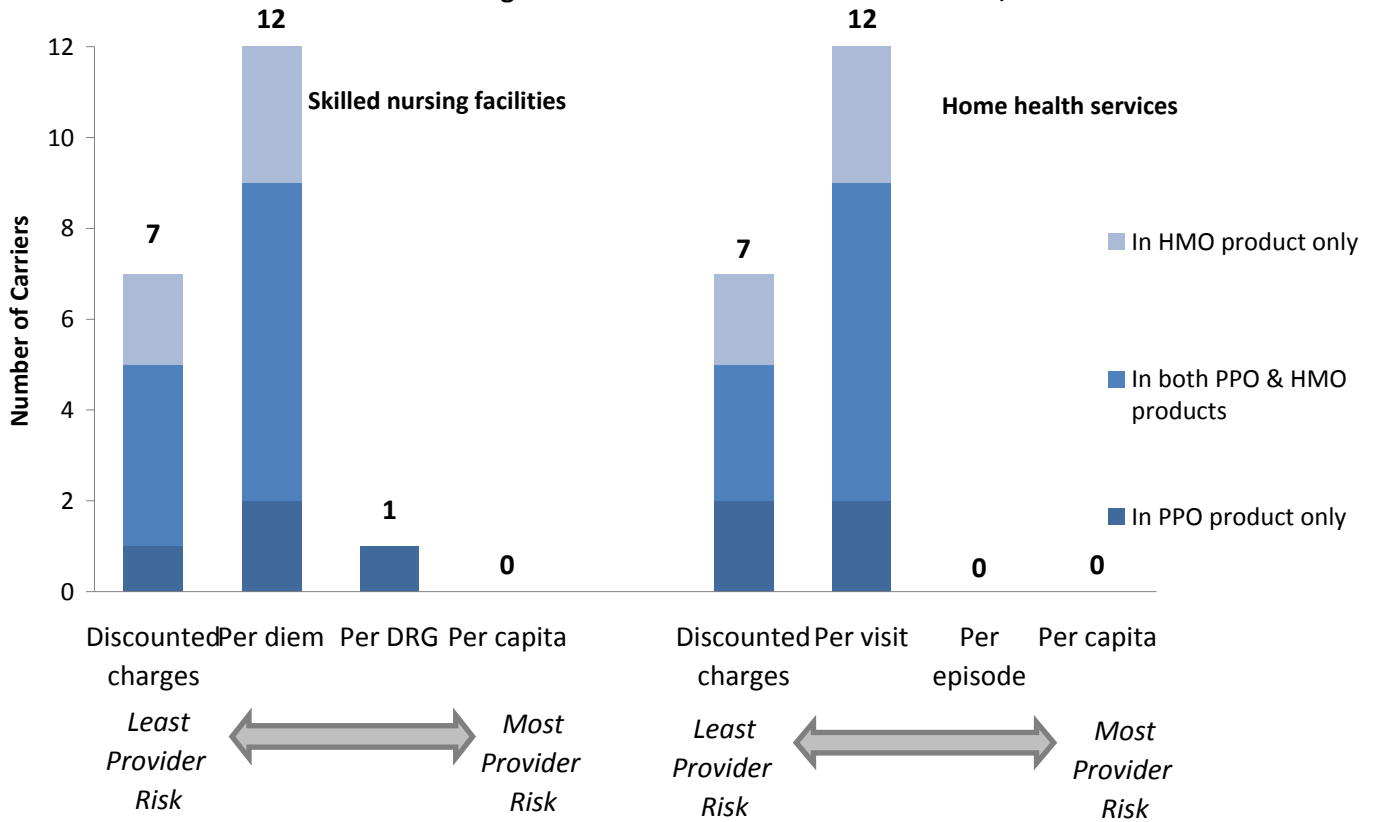
**Figure 2: Number of Carriers Using Selected Payment Methods for Outpatient Hospital Services in their Largest Commercial PPO and HMO Products, 2009**



Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

Note: Carriers may use more than one method to pay for services.

**Figure 3: Number of Carriers Using Selected Payment Methods for Post-Acute Care Services in their Largest Commercial PPO and HMO Products, 2009**



Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

Note: Carriers may use more than one method to pay for services.

Table 5. Number of Carriers Using Selected Payment Methods for Primary Care Physicians and Specialists in Public-Sector Plans, 2009

	Largest Public Products <sup>a</sup>	Largest Medicare Products <sup>a</sup>		Largest Medicaid Products <sup>a</sup>	
	Total number of carriers using payment method	Number of carriers using payment method	Average percent of physicians paid using method <sup>b</sup>	Number of carriers using payment method	Average percent of physicians paid using method <sup>b</sup>
Total number of carriers	8	6	--	3	--
<b>Payment methods used for primary care physicians</b>					
Fee-for-service (FFS)	8	6	81%	3	73%
Capitation	4	3	33%	2	35%
<b>Payment methods used for specialists</b>					
Fee-for-service (FFS)	8	6	97%	3	93%
Capitation	3	2	5%	2	5%

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

Note: Dashes indicate that the category is not applicable.

<sup>a</sup>Each of the 13 responding carriers reported payment methods used by its largest Medicare and/or Medicaid products. Carriers may use more than payment method for each product.

<sup>b</sup> Each carrier reported the percent of physicians they pay with each method, in the following ranges: 1-9%, 10-49%, 50-79%, 80-99%, or 100%. The average percent of physicians paid with the method is calculated as the average of the midpoints of the ranges reported by carriers that used the payment method. See Appendix Tables 1 and 2 for additional detail.

Table 6. Risk Contracts with Intermediate Entities in Public Plans, 2009

	All Carriers with Public Products	Largest Medicare Product <sup>a</sup>	Largest Medicaid Product <sup>a</sup>
Total number of carriers	8	6	3
Carriers that have risk contracts with medical groups, IPAs, or PHOs	4	3	2
Number of carriers sharing global risk	4	3	2
Number of carriers sharing professional risk	1	1	0
Number of carriers sharing hospital risk	1	1	0
Among carriers with risk contracts, average percent of providers paid through risk- contracting entities: <sup>b</sup>			
Primary care physicians	--	22.5%	38.0%
Specialists	--	16.3%	4.5%
Hospitals	--	10.8%	0.0%
Among carriers with risk contracts, average percent of:			
Total lives covered under risk-contracting arrangements <sup>b</sup>	--	64.7%	56.0%
Premiums paid under risk-contracting arrangements <sup>b</sup>	--	64.5%	55.2%

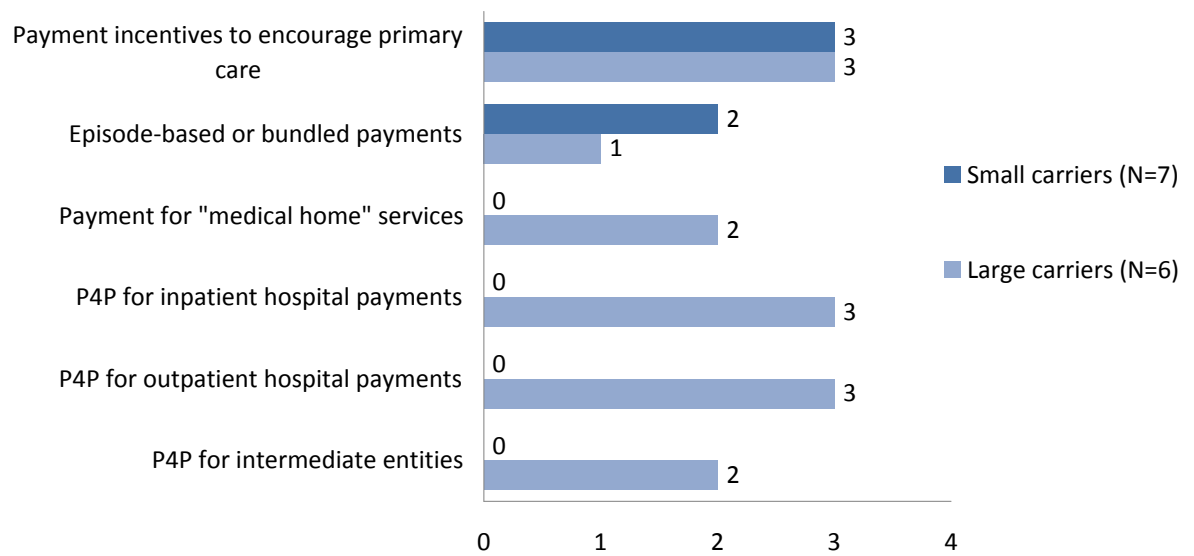
Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

<sup>a</sup> Each carrier reported risk contracts used by its largest Medicaid and/or Medicare plans.

<sup>b</sup> Percentage of providers, covered lives, and premiums paid through risk-contracting entities are calculated only for carriers and products that reported some risk-sharing. The percentages are calculated by weighting each carrier equally.



**Figure 4: Number of Carriers Using Selected Innovative Payment Methods, 2009**



Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

## **Appendix**

Appendix Table 1. Number of Carriers Using Selected Payment Methods for Primary Care Physicians and Specialists in their Largest Commercial PPO or HMO Plans, 2009

	Largest Commercial PPO Product <sup>1</sup> (N=9)					Largest Commercial HMO Product <sup>2</sup> (N=10)				
	Number of carriers using payment method <sup>3</sup>	Number of Carriers Where Percent of Physicians Paid Using Method Is...				Number of carriers using payment method <sup>3</sup>	Number of Carriers Where Percent of Physicians Paid Using Method Is...			
		1-10%	10-49%	80-99%	100%		1-10%	10-49%	80-99%	100%
Payment methods used for primary care physicians										
Large carriers	4	--	--	--	--	5	--	--	--	--
Fee-for-service (FFS)	4	0	0	0	4	5	0	0	3	2
Capitation	0	--	--	--	--	4	2	2	0	0
Salary	0	--	--	--	--	0	--	--	--	--
Small carriers	5	--	--	--	--	5	--	--	--	--
Fee-for-service (FFS)	5	0	0	0	5	5	0	0	3	2
Capitation	0	--	--	--	--	3	2	1	0	0
Salary	0	--	--	--	--	0	--	--	--	--
Payment methods used for specialists										
Large carriers	4	--	--	--	--	5	--	--	--	--
Fee-for-service (FFS)	4	0	0	0	4	5	0	0	3	2
Capitation	0	--	--	--	--	4	4	0	0	0
Salary	0	--	--	--	--	0	--	--	--	--
Small carriers	5	--	--	--	--	5	--	--	--	--
Fee-for-service (FFS)	5	0	0	0	5	5	0	0	1	4
Capitation	0	--	--	--	--	1	1	0	0	0
Salary	0	--	--	--	--	0	--	--	--	--

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

Note: Dashes indicate that the category is not applicable.

<sup>1</sup> The four carriers with the largest PPO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total PPO enrollment, are included in the "Large carriers" category. The remaining five carriers, representing 10 percent of all PPO covered lives, were included in the "Small carriers" category.

<sup>2</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "Large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, were included in the "Small carriers" category.

<sup>3</sup> Each carrier reported payment methods used for its largest PPO and largest HMO products. Carriers may use more than payment method for each product.

Appendix Table 2. Number of Carriers Using Selected Payment Methods for Primary Care Physicians and Specialists in their Public-Sector Plans, 2009

	Largest Medicare Products <sup>1</sup>						Largest Medicaid Products <sup>1</sup>					
	Number of carriers using payment method	Number of Carriers Where Percent of Physicians Paid Using Method Is...					Number of carriers using payment method	Number of Carriers Where Percent of Physicians Paid Using Method Is...				
		1-10%	10-49%	50-79%	80-99%	100%		1-10%	10-49%	50-79%	80-99%	100%
Payment methods used for primary care physicians												
All carriers	6	--	--	--	--	--	3	--	--	--	--	--
Fee-for-service (FFS)	6	0	1	1	1	3	3	0	1	0	1	1
Capitation	3	1	1	1	0	0	2	1	0	1	0	0
Salary	0	--	--	--	--	--	0	--	--	--	--	--
Payment methods used for specialists												
All carriers	6	--	--	--	--	--	3	--	--	--	--	--
Fee-for-service (FFS)	6	0	0	0	2	4	3	0	0	0	2	1
Capitation	2	2	0	0	0	0	2	2	0	0	0	0
Salary	0	--	--	--	--	--	0	--	--	--	--	--

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

<sup>1</sup> Each carrier reported payment methods used for its largest Medicare and largest Medicaid products. Carriers may use more than payment method for each product.

Appendix Table 3. Number of Carriers Using Selected Payment Methods for Hospital Services in their Largest PPO or HMO Plans, 2009

	Largest Commercial PPO Products <sup>1</sup>			Largest Commercial HMO Products <sup>1</sup>		
	All PPO Carriers	Large PPO Carriers <sup>2</sup>	Small PPO Carriers	All HMO Carriers	Large HMO Carriers <sup>3</sup>	Small HMO Carriers
Total number of carriers	9	4	5	10	5	5
Payment methods for inpatient hospital services						
Per DRG	9	4	5	9	5	4
Per diem	8	3	5	9	4	5
Discounted charges or fee schedule	8	3	5	8	5	3
Per capita	0	0	0	2	1	1
Payment methods for hospital ambulatory surgery						
Discounted charges or fee schedule	8	3	5	9	5	4
Standard per case	7	2	5	7	3	4
Per APC (ambulatory payment classification)	2	0	2	2	1	1
Case-mix adjusted	2	1	1	1	1	0
Per capita	0	0	0	0	0	0
Payment methods used for most other hospital services						
Per visit	8	3	5	7	4	3
Discounted charges or fee schedule	4	3	1	7	3	4
Per episode	1	1	0	1	0	1
Per capita	0	0	0	2	1	1

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing

<sup>1</sup> Each carrier reported payment methods used for its largest PPO and largest HMO product. Carriers may use more than payment method for each service type.

<sup>2</sup> The four carriers with the largest PPO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total PPO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all PPO covered lives, were included in the "small carriers" category.

<sup>3</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, were included in the "small carriers" category.

Appendix Table 4. Number of Carriers Using Selected Payment Methods for Long-Term Care Services in their Largest PPO or HMO Plans, 2009

	Largest Commercial PPO Products <sup>1</sup>			Largest Commercial HMO Products <sup>1</sup>		
	All PPO Carriers	Large PPO Carriers <sup>2</sup>	Small PPO Carriers	All HMO Carriers	Large HMO Carriers <sup>3</sup>	Small HMO Carriers
Total number of carriers <sup>3</sup>	9	4	5	10	5	5
Payment methods for skilled nursing facilities						
Per diem	9	4	5	10	5	5
Discounted charges or fee schedule	5	2	3	6	4	2
Per DRG	1	0	1	0	0	0
Per capita	0	0	0	0	0	0
Payment methods for home health services						
Per visit	9	4	5	10	5	5
Discounted charges or fee schedule	5	1	4	5	4	1
Per episode	0	0	0	0	0	0
Per capita	0	0	0	0	0	0

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division of Health Care Financing and Policy.

<sup>1</sup> Each carrier reported payment methods used by its largest PPO and largest HMO product. Plans may use more than payment method for each service type.

<sup>2</sup> The four carriers with the largest PPO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total PPO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all PPO covered lives, were included in the "small carriers" category.

<sup>3</sup> The five carriers with the largest HMO enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total HMO enrollment, are included in the "large carriers" category. The remaining five carriers, representing 10 percent of all HMO covered lives, were included in the "small carriers" category.

Appendix Table 5. Number of Carriers Using Selected Innovative Payment Methods, 2009

	All Carriers <sup>1</sup>	Large Carriers <sup>2</sup>	Small Carriers
Total number of carriers <sup>3</sup>	13	6	7
	3	1	2
Number of carriers using innovative payment methods to improve primary care <sup>6</sup>	6	3	3
Payment for "medical home" services	2	2	0
Other payment incentives to encourage or enhance delivery of services	6	3	3
...incentive or bonus payments for use of technology	2	2	0
...incentive or bonus payments tied to quality measures	3	2	1
...incentive or bonus payments tied to cost, utilization, or efficiency measures	3	2	1
...other pay-for-performance programs	1	0	1
Number of carriers incorporating pay-for-performance into inpatient hospital payments	3	3	0
Among carriers using pay-for-performance for inpatient payments, average percentage of hospitals affected	57%	57%	--
Pay-for-performance measures used:			
Process of care quality measures	3	3	--
Patient safety measures	2	2	--
Outcome quality measures	1	1	--
Resource use or efficiency measures	1	1	--
Hospital governance measures	1	1	--
HCAPS consumer survey information	1	1	--
Number of carriers incorporating pay-for-performance into outpatient hospital payments	3	3	0
Among carriers using pay-for-performance for outpatient payments, average percentage of outpatient facilities or freestanding clinics affected	50%	50%	--
Pay-for-performance measures used:			
Process of care quality measures	3	3	--
Outcome quality measures	2	2	--
Resource use or efficiency measures	2	2	--
Patient safety measures	1	1	--
Hospital governance measures	1	1	--
Number of carriers incorporating pay-for-performance into payments to intermediate entities	2	2	0
Pay-for-performance measures used:			
Process of care quality measures	2	2	--
Outcome quality measures	1	1	--
Resource use or efficiency measures	1	1	--
Patient satisfaction	1	1	--

Source: Mathematica Policy Research analysis of a survey of thirteen Massachusetts health insurance carriers conducted for the Division

<sup>1</sup> All products includes commercial HMOs, commercial PPOs, Medicare plans, or Medicaid plans.

<sup>2</sup> The six carriers with the largest commercial enrollment in December 2008 (including both self- and fully-insured members), representing 90 percent of total commercial enrollment, are included in the "large carriers" category. The remaining seven carriers were included in the "small carriers" category.

<sup>3</sup> Each carrier reported innovative payment methods used by any of its PPO, HMO, Medicare, or Medicaid products.

<sup>4</sup> A single payment covering both facility and physician or professional charges. This does not include bundled payments for facility charges only (e.g., DRGs).

<sup>5</sup> Not including the payment methods for physicians covered in Table 3.

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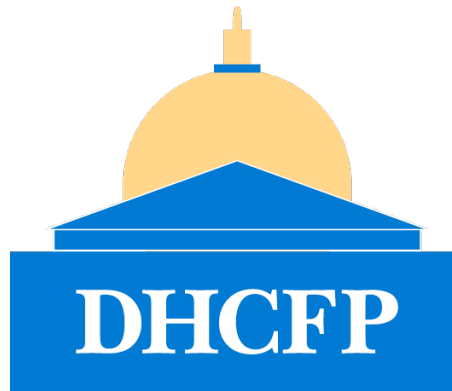
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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.2a**

### **Part II: Private Health Insurance Premium Trends 2006-2008**

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# **Massachusetts Health Care Cost Trends**

## **Part II: Private Health Insurance Premium Trends**

### **2006-2008**

**February 2010**

**Deval L. Patrick, Governor**  
Commonwealth of Massachusetts

**Timothy P. Murray**  
Lieutenant Governor



**JudyAnn Bigby, Secretary**  
Executive Office of Health and Human Services

**David Morales, Commissioner**  
Division of Health Care Finance and Policy

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# About this Report

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This report is the second in a series of reports to be issued by the Massachusetts Division of Health Care Finance and Policy (DHCFP) as part of its new responsibilities under Chapter 305 of the Acts of 2008 to provide information and analysis on health care cost trends and the factors that underlie the trends. The analyses covered in these reports were developed with the strategic input of staff from Brandeis University's Heller School for Social Policy and Management, and with analytics conducted by Mathematica Policy Research, Inc. and Oliver Wyman Actuarial Consulting, Inc.

This report documents the major trends in private health insurance premiums in Massachusetts from 2006 through 2008. Health insurance premiums are important because they are the primary means by which most consumers and employers experience medical costs, and therefore are a critical measure of the affordability of health coverage.

However, this analysis of premiums tells only one part of the story of health care cost trends. First, it excludes information on self-insured employers, which do not pay premiums. This report focuses on the fully-insured private health insurance markets, which represent roughly 34% of covered lives in Massachusetts. "Fully-insured" groups purchase health insurance coverage policies from health insurers, whereas "self-insured" groups bear the financial risk and pay for their covered health care expenses directly, but may use an insurer as an administrator. A large and growing segment of the privately insured market is enrolled through self-insured employer groups. Analyzing their experience is critical for understanding trends in health care costs.

Second, trends in Massachusetts health insurance premiums are determined largely by the medical care delivery system, including trends in health care utilization, provider prices, payment methodologies. Additional reports also being released will cover analysis of medical claims data (which will include self-insured and fully-insured data) and provide an overview of the Massachusetts health care market place more generally.

Finally, this year's cost trends reports focus only on private insurance and associated medical spending. Future years' reports will also include analysis of public coverage – including Medicare, MassHealth and Commonwealth Care.

The premiums presented in this report represent premiums paid per member per month (PMPM). The PMPM premiums are calculated as total annual premiums collected by the insurer divided by total member months. Therefore, the PMPM premiums reflect the average premiums paid per covered person, where the covered person could be a subscriber or dependent. This amount differs from the actual premiums quoted in the market since premiums are quoted per subscriber, and not per covered person or covered member. Even premiums for single coverage are typically higher than the average PMPM premium. This occurs primarily because the individual subscriber may be of higher age than the average member, since the average member age includes dependent children.

This report is based on analyses conducted by Oliver Wyman Actuarial Consulting, Inc. from data submitted by 15 health insurers on their private fully insured commercial business in Massachusetts for calendar years 2006, 2007, and 2008 (see [www.mass.gov/dhcfp/costtrends](http://www.mass.gov/dhcfp/costtrends) for a copy of the full technical report).



# Introduction

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Massachusetts' health insurance premiums are higher than the United States average and grew at a faster rate from 2001 to 2008. Both state and national premiums have been rising annually at rates well above overall inflation and average wages since 2000 (increasing on average at 7.5% annually for Massachusetts and 6.5% nationally). Massachusetts' individual and family premiums were 10% and 12% higher, respectively, than the US average in 2006, 2007, and 2008.

Rising health insurance premiums in Massachusetts pose significant challenges to individuals and businesses, and continue to affect the nature of employer-sponsored insurance, the mechanism by which the majority of residents in the state are covered. Current data indicate that in Massachusetts, as well as across the nation, employees have been required to pay for a growing proportion of premiums and accept higher cost sharing for health care services (i.e., larger deductibles and/or copayments).

This report presents trends in the insurance market and premiums by market segment, including individuals who purchase coverage directly (not through an employment relationship); small groups (groups with 1-50 eligible employees, including self-employed individuals); mid-size groups (groups with 499 or fewer enrolled employees that do not meet the definition of a small group); and large groups (groups of 500 or more enrolled employees). This approach is used because state insurance regulations, patterns of enrollment, and premium trends differ among these groups.

**Sources:** Medical Expenditure Panel Survey, Agency for Healthcare Quality and Research, Available at: <http://www.meps.ahrq.gov>  
*Trends in Health Claims for Fully-Insured, Health Maintenance Organizations in Massachusetts, 2002-2006.* Report to the Health Care Access Bureau of the Massachusetts Division of Insurance, September 19, 2008. Available at: <http://www.mass.gov/Eoca/docs/doi/Consumer/MAHMOReport.pdf>  
*Health Insurance Coverage in Massachusetts: Results From the 2008 and 2009 Massachusetts Health Insurance Surveys.* Long, S. K., Phadera, L. & Stockley, K. Massachusetts Division of Health Care Finance and Policy, 2009.  
Medical Expenditure Panel Survey, State and Metro Level Data, Agency for Healthcare Research and Quality. Available at: [http://www.meps.ahrq.gov/mepsweb/survey\\_comp/Insurance.jsp](http://www.meps.ahrq.gov/mepsweb/survey_comp/Insurance.jsp).





# Executive Summary

## Premium Growth

- **Premiums increased roughly 12% in total from 2006-2008.** They grew more slowly in 2008 (5.0%) than they did in 2007 (6.9%) on average.
  - Premium growth would likely have been greater than 12.2% over the two trend periods had it not been for employers reducing the richness of the benefits they offer.
- **Growth in premiums was caused primarily by growth in medical claims** for both 2006-2007 and 2007-2008.
  - 97% of the total per member per month (PMPM) premium growth from 2006 to 2007 was attributable to claims, and 94% of the total growth from 2007 to 2008 was attributable to claims.

## Differences in Premiums by Market Segment

- **Average large group premiums consistently exceeded mid-size and small group premiums** from 2006 to 2008.
  - Unadjusted large group premiums in 2008 were roughly 6% higher than small group premiums and 8% higher than mid-size groups.
  - The major reason average small group premiums are lower than average large group premiums is that, on average, small employers purchase lower levels of coverage.
- In 2008, **small group premiums were 5.8% higher than large group premiums and 4.9% higher than mid-size groups, when adjusted for benefits, demographics and location.** This difference was largely driven by higher medical claims expenses in the small group market.
- **Small group premiums on average grew faster than mid-size and large group premiums, when adjusted for differences in benefits, demographics and location among the three market segments.**

- For any specific employer group, premium levels and trends can vary substantially from the average.
  - Premium volatility due to changes in demographics of enrolled employees are especially significant for small groups.

## Reductions in Benefit Levels

- **Large groups tend to purchase coverage with richer benefits than do mid-size or small groups,** but groups of all sizes are reducing benefits for employees, based on analysis of the most popular products.
  - An overall decrease in the level of benefits in Massachusetts is similar to national trends, which indicate that employers and other payers have been “buying down” benefits by increasing cost sharing or raising deductibles over the past several years.

## Health Plan Spending on Non-Medical Expenses

- **In 2009, 12.4% of premiums paid by small employers went to non-medical expenses, compared to 11.3% of premiums for mid-size employers and 9.6% of premiums for large employers.** The difference in non-medical expenses may be due in part to higher administrative expenses in the small group market where fixed administrative costs must be spread over a smaller population base.
- **Growth in the proportion of premium revenues devoted to non-claims expenses, while lower than that for premiums overall, was greater for large groups than small or mid-size groups.**

## Individual Premium Rates Available through the Merged Market

- **On average, premiums in the individual merged market in 2008 were 33% lower than premiums in the residual non-group market,** due to new risk pooling and rating rules, as well as expanded product offerings with less rich benefits in the merged market.

**Note:** Claims are payments made for health care services covered by insurance premiums. Premium growth can be the result of rising costs and/or rising utilization.



# Private Health Insurance Market Segments

Market Segment	Percent of Total Private Enrollment		
	2006	2007	2008
Individual	1.3%	1.2%	1.8%
Small group (1-50)	18.3%	17.7%	17.1%
Mid-size group (51-499)	19.9%	19.3%	19.3%
Large group (500+)	15.1%	14.7%	13.5%
Self-insured groups of all sizes	45.4%	47.1%	48.4%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Approximately half of the privately insured market in Massachusetts is enrolled in a fully-insured health plan, ranging from direct-purchase individual plans to large group plans. The remaining half is covered through employers that are self-insured. This table depicts the distribution of enrollment in the private market by year, based on data submitted by insurers, and upon which the reported trends are based.

Over the three years studied, the proportion of enrollees enrolled in the self-insured and individual market segments increased while the proportion of enrollees enrolled in the small, mid-size and large group markets decreased.

In 2008, actual enrollment numbers were:

71,565 in the individual market; 686,297 in the small group market; 776,062 in the mid-size group market; 543,035 in the large group market; 1,944,412 in the self-insured market.

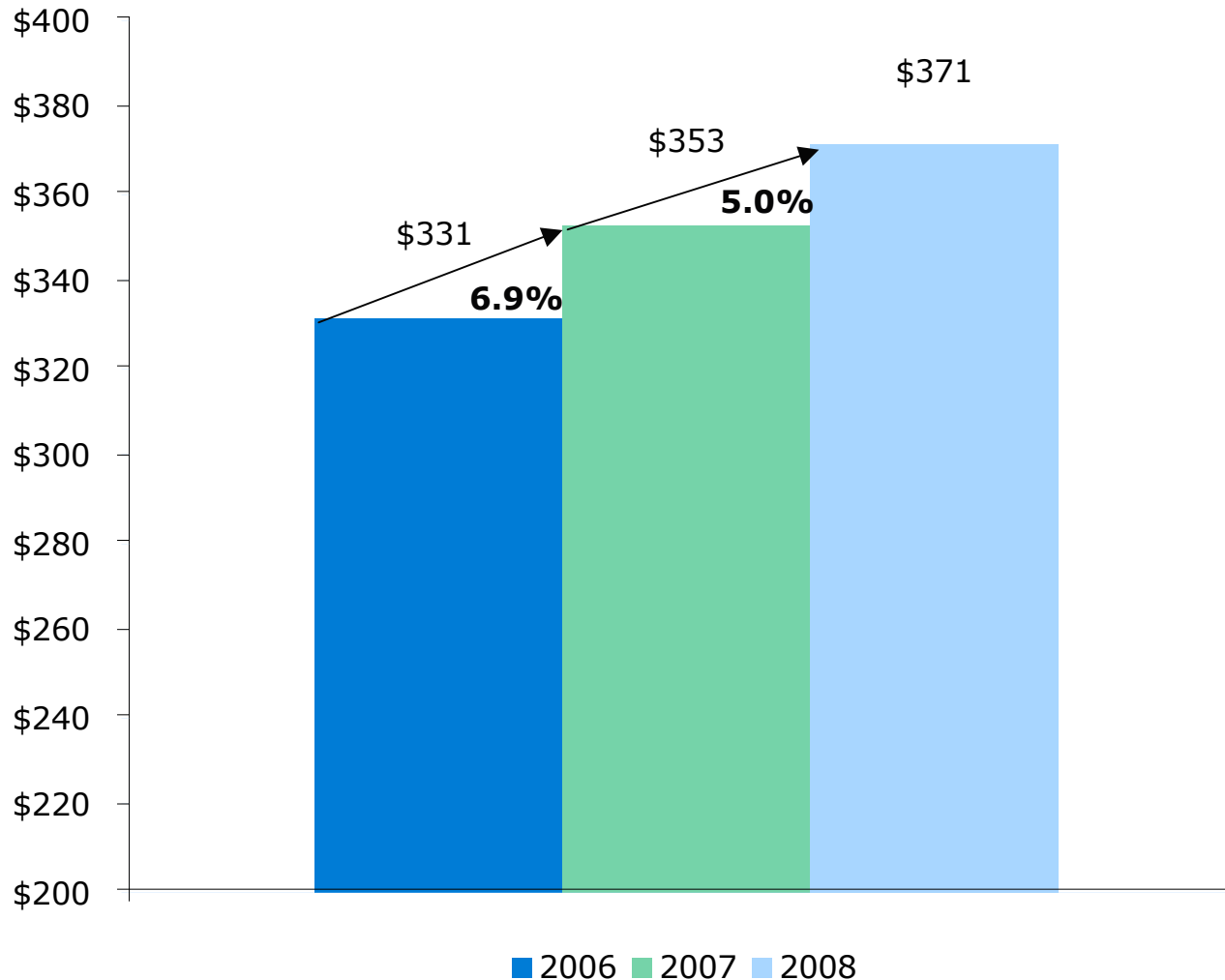


**Note:** *Fully-insured* groups purchase health insurance coverage policies from health insurers. *Self-insured* groups bear the financial risk and pay for their covered health care expenses directly, but may use an insurer as an administrator. Percentages may not add to 100% due to rounding.

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# Premium Trends

# Average Private Insurance Premiums PMPM: All Market Segments Combined



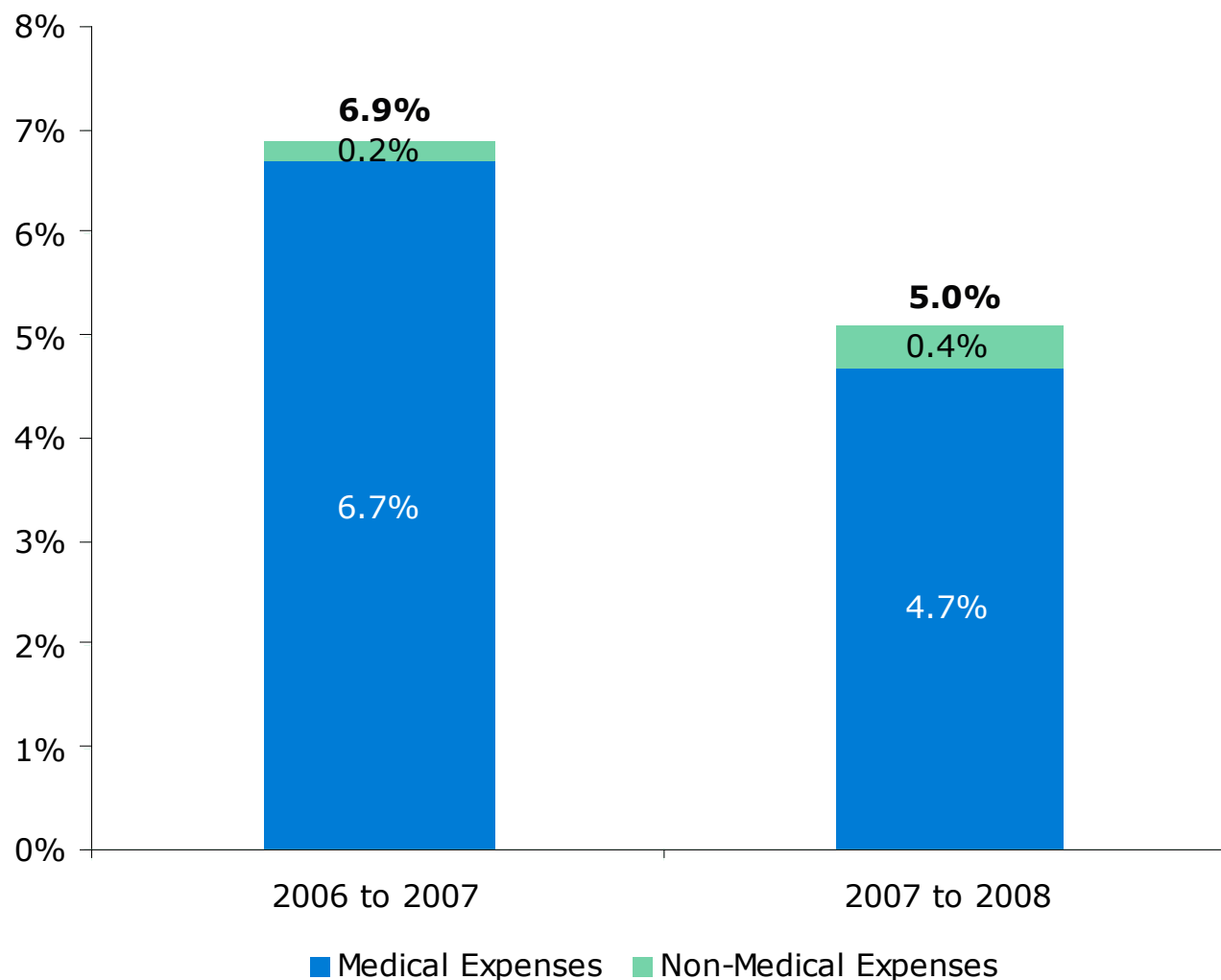
**Average premiums per member per month increased 12.2% from 2006-2008.** Premiums grew more slowly in 2008 (5.0%) than they did in 2007 (6.9%) across all market segments, on average.

Premium growth would likely have been greater than 12.2% over the two trend periods had it not been for employers reducing the richness of the benefits they offer.

Note: For any specific employer group, premium levels and trends can vary substantially from the average.

**Note:** These figures refer to all Massachusetts fully-insured groups across all group sizes. Trends shown are based on unadjusted un-rounded premiums.

# Components of Premium Growth



**Growth in premiums from 2006 to 2008 were driven by growth in medical claims expenses.**

Total premium growth was 6.9% from 2006 to 2007, and 5.0% from 2007 to 2008.

Ninety-seven percent (97%) of the growth from 2006 to 2007 and 94% of the growth from 2007 to 2008 were attributable to medical expenses.

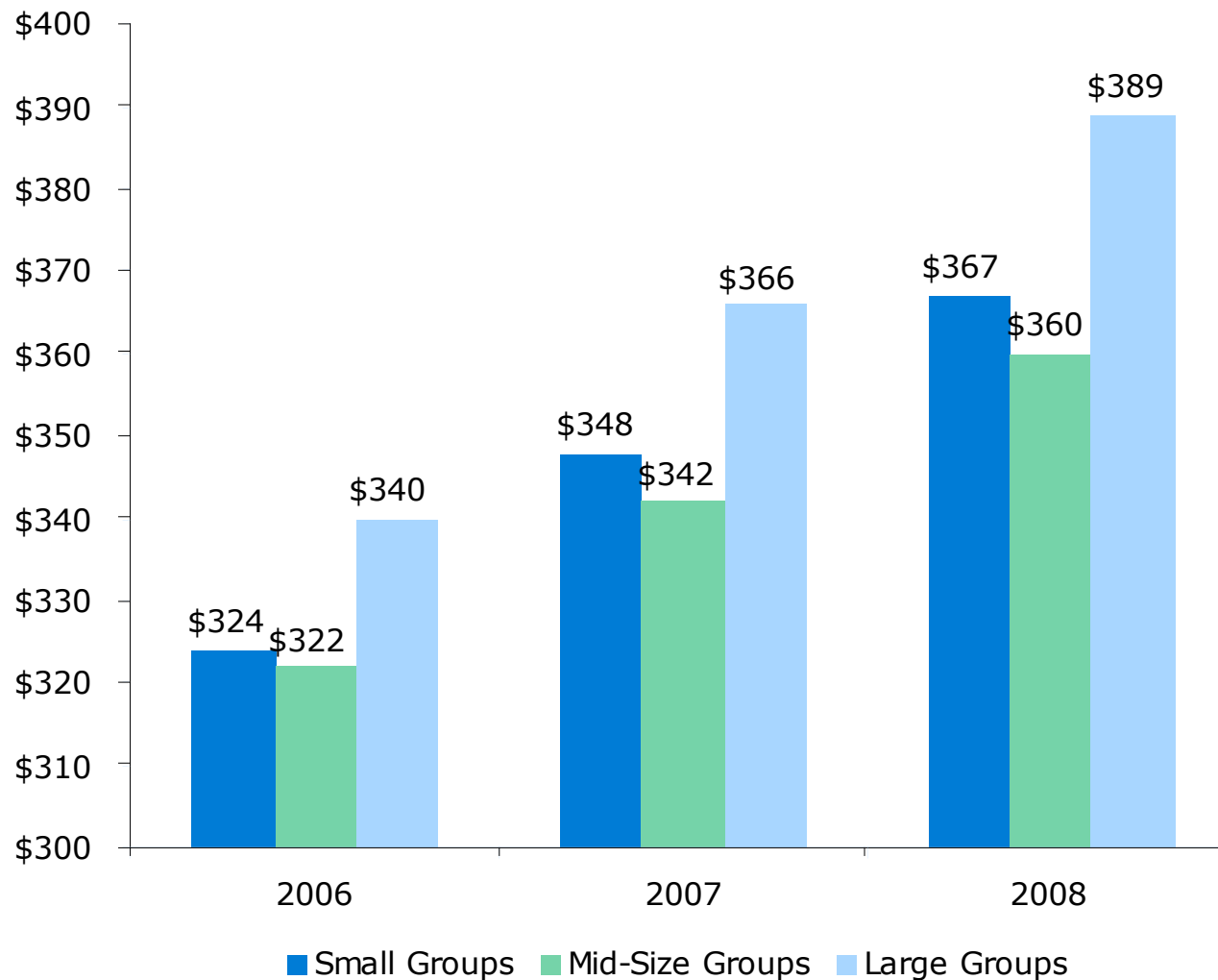
Non-medical expenses include health plan administration, brokers' fees and commissions, and contribution to health plan surplus/reserves.

Medical expenses include spending on claims to reimburse providers for covered services.

Health plan spending on programs to help manage care such as disease management and care management may be categorized by the insurer as part of either medical or non-medical spending.

**Note:** These figures refer to all Massachusetts fully-insured groups across all group sizes.

# Average Monthly Private Insurance Premiums PMPM by Market Segment



**Average large group premiums PMPM consistently exceeded mid-size and small group premiums from 2006 to 2008.**

The major reason average small and mid-size group premiums are lower than average large group premiums is that small and mid-size employers tend to purchase lower levels of benefits.

In addition, small and mid-size groups have different demographics; on average, small groups have slightly fewer women, which reduces average premiums, and a relatively higher proportion of small group members work for an employer located outside Boston where medical costs are lower.

Note: For any specific employer group, premium levels and trends can vary substantially from the average.



Note: These figures refer to all Massachusetts fully-insured groups. Trends shown are based on unadjusted premiums.

# Adjusted Premiums by Group Size

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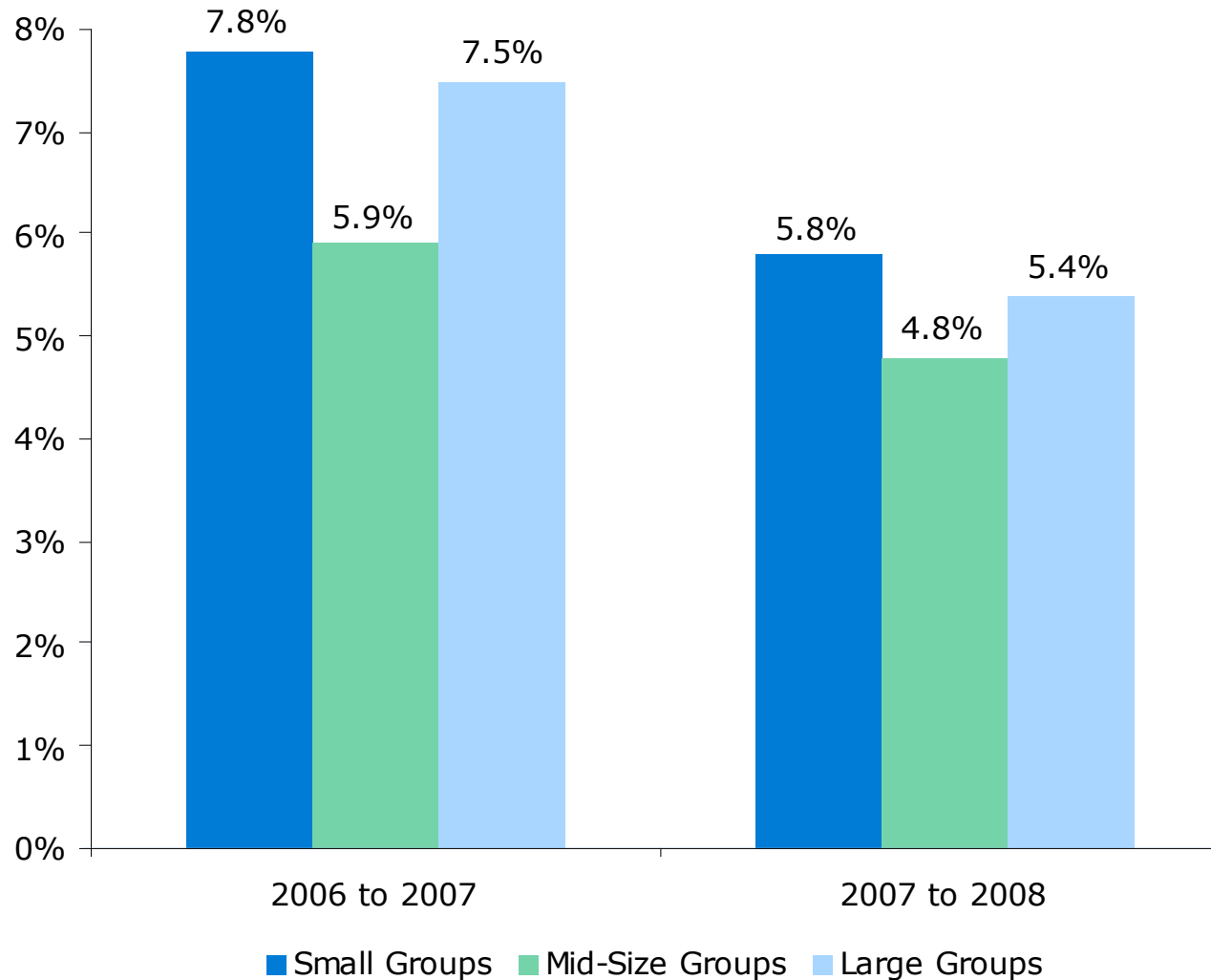
When adjusted for differences in benefit levels and demographics, **adjusted small group premiums PMPM were 5.8 percent higher than large group premiums and 4.9 percent higher than mid-size group premiums in 2008.**

- Two-thirds of the difference between small and large group adjusted premiums was due to higher medical claims expenses in the small group segment and one-third was due to higher administrative and other non-medical expenses.

- Approximately 90 percent of the difference between small and mid-size group segments was due to claims expenses and 10 percent was due to higher administrative and other non-medical expenses.

- Higher claims expense may be attributable to some inherent characteristics of the small employer segment, including higher employer and employee turnover rates, or other factors that were not examined in this report (e.g., higher morbidity, use of a different mix of providers).

# Annual Growth in Premiums PMPM Adjusted for Benefits and Demographics by Market Segment (Annual Percent Increase)



**Small group premiums PMPM, on average, grew faster than mid-size and large group premiums**, when adjusted for differences in benefits, demographics, and location among the three market segments.

Higher growth among small groups appears to be driven by medical spending, rather than non-medical spending.

Note: For any specific employer group, premium levels and trends can vary substantially from the average.



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# **Volatility and Variation in Premium Trends**

# Premium Volatility in the Small Group Market

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Rating rules in the merged individual and small group market are intended to limit the amount of variation in premiums. Premiums in the merged market are set off a base rate representing the average claims experience for the insurer's entire enrollment in the merged market. The rating rules permit that the actual premiums charged to an individual or particular small group can vary – within regulatory limits – based on a group's age distribution, the region in which the group is located, the industry, the size of the group and benefit levels. (See Appendix A for a graphical depiction of the way in which premiums are set in the merged market.)

Even with these regulatory limitations, however, premium rates charged to a given small group can vary substantially from the average. In addition, from one year to the next, a small change in the make-up of the employees enrolled in an individual employer's small group can result in premium growth very different from the average trend (including both higher and lower growth rates).

Premium volatility may be one reason why a much lower proportion of employers with 3 to 10 workers offer health insurance to their workers, only 67%, compared to upwards of 92% of employers with 11 or more workers.

Examples of the types of premium increase variations that can occur are included on the following page.



**Source:** *The 2009 Massachusetts Employer Survey*, Division of Health Care Finance and Policy. For more information, go to [www.mass.gov/dhcfp/](http://www.mass.gov/dhcfp/) and click on "Publications and Analyses."

# Impact of Employer Size and Age on Premium Increases

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Premium volatility due to changes in demographics of enrolled employees can be especially significant for small groups, where each enrolled individual represents a significant percentage of the total group, unlike in a larger group where the risk of any one individual can be spread more broadly.

## Group Size Factor Example

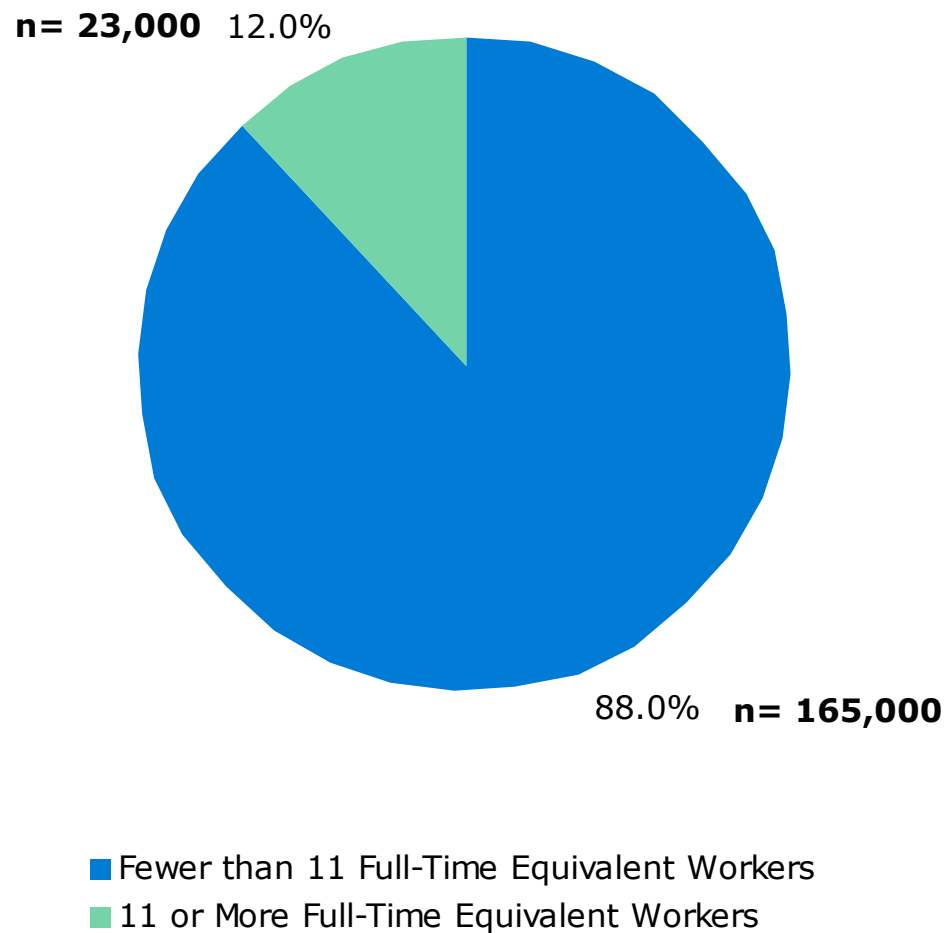
The group size factor permitted in the merged market can have a significant impact on premium volatility. For example – take a company with 6 employees enrolled in the employer’s health insurance, and average small group premium increases of 6.0%. If one of those employees of average age leaves the group, resulting in a group of 5 employees, the premium rate increase would be 15.8%. On the other hand, for a company with 20 employees who had a similar proportion of employees of average age leave the group (i.e., 3 employees) leaving a group of 17 employees, the premium rate increase would be only 6.1%.

## Age Rating Example

The age rating permitted in the merged market can also have a significant impact on premium growth. For example – take a company with 20 employees enrolled in the employer’s health insurance offering. If from one year to the next, none the firm’s employees age into an older age rating band (typically insurers set age rating factors based on five-year increments) the premium increase would be 6.0%. However, and what is more likely, if that same group of 20 employees were to have 6 of its employees age into the next five-year age band, the premium increase charged to the employer would be 10.7%.

For additional examples of premium growth variability for small employers of different sizes, please see Appendix B.

# Massachusetts Employer Landscape: Distribution of Employers by Size



Approximately 88% of Massachusetts employers have fewer than 11 full-time equivalent employees, indicating that premium growth and volatility is a major problem for the vast majority of Massachusetts businesses.

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## **Benefit Levels by Market Segment**

# Differences in Most Popular Products by Market Segment

	2008 Individual Post-Merger Median	2008 Small Group Median	2008 Mid-Size Group Median	2008 Large Group Median
<b>Actuarial Value</b>	0.726	0.882	0.882	0.915
<b>Deductible</b>	\$2,000	None	None	None
<b>Primary Care Office Visit</b>	\$25	\$20	\$20	\$15
<b>Specialist Office Visit</b>	\$25	\$20	\$20	\$15
<b>Inpatient Copayment</b>	\$500	\$500	\$500	\$250
<b>Outpatient Surgery Copayment</b>	\$250	\$250	\$250	\$150
<b>Emergency Room Copayment</b>	\$75	\$75	\$75	\$75
<b>Pharmacy Deductible</b>	None	None	None	None
<b>Retail Generic</b>	\$10	\$15	\$15	\$10
<b>Retail Preferred</b>	\$30	\$30	\$30	\$30
<b>Retail Non-Preferred</b>	\$60	\$50	\$50	\$50

**Large groups tend to purchase coverage with richer benefits than do mid-size or small groups or individuals.** In 2008, for the most popular products offered by insurers, the median small group and mid-size group most popular products had higher copayments for physician services (\$20 versus \$15), double the copayments for inpatient services (\$500 versus \$250), and higher copayments for outpatient surgery (\$250 versus \$150) when compared with the median large group most popular product.

The median most popular individual plan had a \$2,000 deductible, whereas the median most popular plan for the small, mid-size, and large group markets had no deductibles.

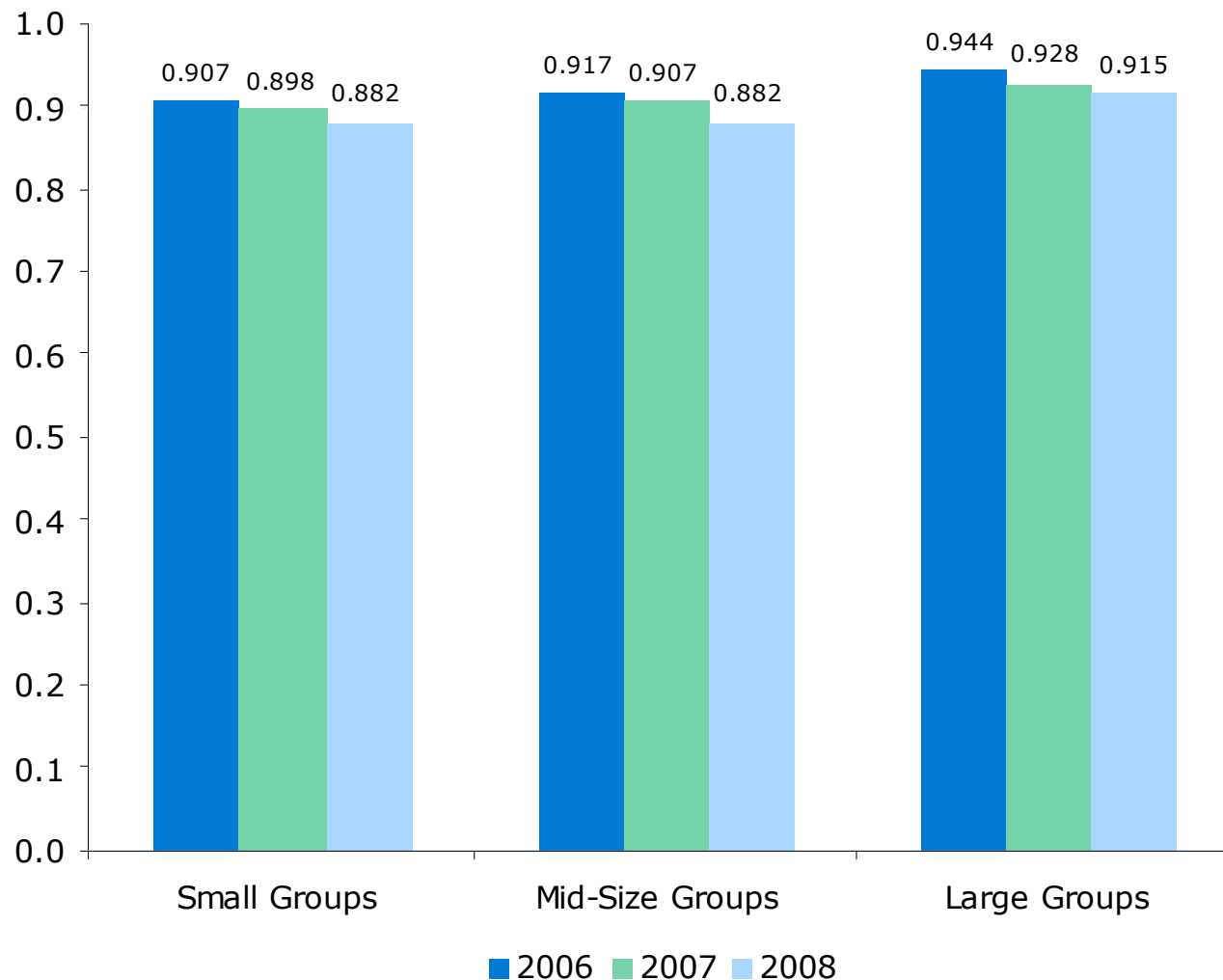


**Note:** Actuarial value is a measure of the relative richness of a benefit plan in terms of what is covered by the premium versus what health care costs must be covered out-of-pocket by the enrollee. The highest possible actuarial value, which would be attributed to the plan with the richest benefits (and lowest copayments), is 1.0. The higher the actuarial value, the lower the patient's cost sharing for the same benefits.

# Benefit Reductions Across All Market Segments'

## Most Popular Products

### Median Actuarial Value by Market Sector



**Employer groups of all sizes moved toward less generous benefits between 2006 and 2008** as represented by a decline in the median actuarial value of the most popular products offered in each market segment.

Actuarial value is a measure of the relative richness of a benefit plan in terms of what is covered by the premium versus what health care costs must be covered out-of-pocket by the enrollee. The highest possible actuarial value, which would be attributed to the plan with the richest benefits (and lowest copayments), is 1.0. The higher the actuarial value, the lower the patient's cost sharing for the same benefits.

# Massachusetts' Benefit Buy-Down Trends Compared to National Trends

An overall decrease in the level of benefits in Massachusetts is consistent with national trends, which indicate that employers and other payers have been “buying down” benefits, by increasing cost sharing or raising deductibles over the past several years.

Nationally, annual employee contributions in actual dollars rose from 1996 to 2006 by approximately 130%, far outpacing premium or employer contribution increases. However, the trend towards benefit buy-down appears to be more significant on the national level than in Massachusetts. Nationally, deductibles for employer-sponsored plans overall tripled between 2000 and 2008, and deductibles for plans offered by firms with fewer than 200 employees more than quadrupled during this period.

Cost sharing by employees is less prevalent in the Massachusetts market. The percent of private sector employees in Massachusetts who were enrolled in a health insurance plan with a deductible was 47.1% in 2008. Nationally, that figure was 70.7%. In addition, The average deductible in Massachusetts for individuals covered by plans with deductibles was \$627 in 2008 compared with \$869 nationally.

While reducing benefits lowers premiums, it also shifts costs to employees and leaves enrollees with less comprehensive health benefits, which can lead to a reduction in utilization of needed health care services, as well as financial insecurity and medical debt.

**Sources:** *Premiums, Employer Costs, and Employee Contributions for Private Segment Employer-Sponsored Health Insurance, Single Coverage by Firm Size, 1996-2006, Statistical Brief #231.* Agency for Healthcare Research and Quality. January, 2009. Available at: [http://www.meps.ahrq.gov/mepsweb/data\\_files/publications/st231/stat231.pdf](http://www.meps.ahrq.gov/mepsweb/data_files/publications/st231/stat231.pdf)  
*Table II.F.1(2008) Percent of private-sector employees enrolled in a health insurance plan that had a deductible by firm size and State.* Agency for Healthcare Research and Quality, Center for Financing, Access and Cost Trends. 2008 Medical Expenditure Panel Survey-Insurance Component. Available at: [http://www.meps.ahrq.gov/mepsweb/data\\_stats/summ\\_tables/insr/state/series\\_2/2008/tiif1.pdf](http://www.meps.ahrq.gov/mepsweb/data_stats/summ_tables/insr/state/series_2/2008/tiif1.pdf)  
*Table II.F.1. Average individual deductible (in dollars) per employee enrolled with single coverage in a health insurance plan that had a deductible at private-sector establishments by firm size and State: United States, 2008.* Agency for Healthcare Research and Quality, Center for Financing, Access and Cost Trends. 2008 Medical Expenditure Panel Survey-Insurance Component. Available at: [http://www.meps.ahrq.gov/mepsweb/data\\_stats/summ\\_tables/insr/state/series\\_2/2008/tiif2.pdf](http://www.meps.ahrq.gov/mepsweb/data_stats/summ_tables/insr/state/series_2/2008/tiif2.pdf)  
M. Reed, V. Fung, M. Price et al., "High-Deductible Health Insurance Plans: Efforts to Sharpen a Blunt Instrument," *Health Affairs*, July/Aug. 2009, 28(4):1145-53.  
Robert H. Brook, Emmett B. Keeler, Kathleen N. Lohr, Joseph P. Newhouse, et al. "A Classic RAND Study Speaks to the Current Health Care Reform Debate," *RAND*. Available at: [http://www.rand.org/pubs/research\\_briefs/RB9174/index1.html](http://www.rand.org/pubs/research_briefs/RB9174/index1.html)  
The Kaiser Family Foundation and Health Research & Educational Trust Employer Health Benefits 2008 Annual Survey. Available at: <http://ehbs.kff.org/>



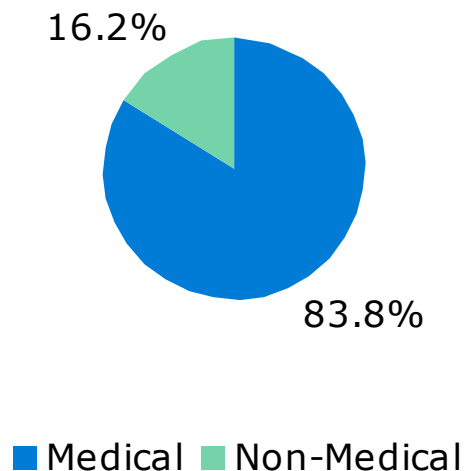


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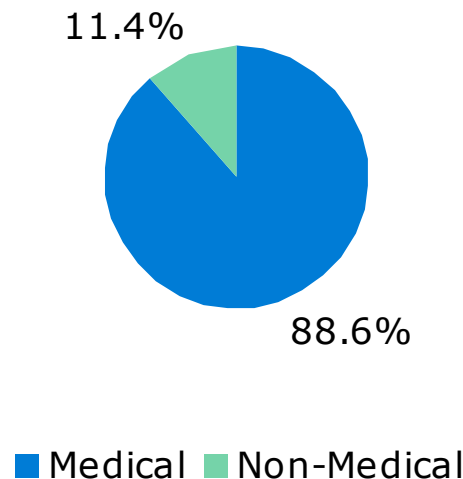
# Health Plan Spending on Non-Medical Expenses by Market Segment

# Non-Medical Spending as Percent of Premium

**National  
Medical versus  
Non-Medical Spending, 2008**



**Massachusetts  
Medical versus  
Non-Medical Spending, 2008**



**Nationally, insurers tend to spend a much greater percentage of premiums on non-medical expenses than Massachusetts insurers.**

The proportion of premium revenues devoted to medical expenses is referred to as the "medical loss ratio" or "medical expense ratio."

In 2008, the average medical expense ratio for Massachusetts insurers studied was 88.6%, meaning that on average, insurers spent 11.4% of premium revenue on non-medical expenses. For the same year, the medical expense ratio for the six largest national insurers was 83.8%.

**Source:** United States Senate, Commerce Committee, correspondence dated November 2, 2009. Available at: [http://commerce.senate.gov/public/\\_files/HanwayLetterPart1of2.pdf](http://commerce.senate.gov/public/_files/HanwayLetterPart1of2.pdf) and [http://commerce.senate.gov/public/\\_files/HanwayLetterPart2of2.pdf](http://commerce.senate.gov/public/_files/HanwayLetterPart2of2.pdf)

**Note:** Premium revenues go towards medical expenses and non-medical expenses. Non-medical expenses include (1) general administrative expenses, (2) contribution to surplus or profit, and (3) broker commissions. Medical spending includes payments for covered health care services. Services such as disease management and case management may be categorized within either medical or non-medical spending.

# Non-Medical Spending as Percent of Premium in Massachusetts by Market Segment

## Average Non-Medical Expenses as a Percent of Premium by Market Segment, Second Quarter 2009

	Small Group (1-50)	Mid-Size Group (<500)	Large Group (500+)
Administration	7.5%	6.1%	6.2%
Commissions	2.1%	2.4%	1.2%
Contribution to Surplus	2.8%	2.8%	2.2%
<b>Total Non-Claims Expenses</b>	<b>12.4%</b>	<b>11.3%</b>	<b>9.6%</b>
<b>Total Claims Expenses (100% minus Non-Claims Expenses)</b>	<b>87.6%</b>	<b>88.7%</b>	<b>90.4%</b>

**In 2009, 12.4% of premiums paid by small employers went to non-medical expenses, compared to 11.3% of premiums for mid-size employers and 9.6% of premiums for large employers.**

The difference in non-medical expenses may be due in part to higher administrative expenses in the small group market where fixed administrative costs must be spread over a smaller population base.

Additionally, insurers may charge smaller risk premiums to the large group segment as they are developing the medical component of premium rates because the insurers can more reliably "experience rate" groups of those sizes. This effectively lowers the non-medical expense category for the large group segment.

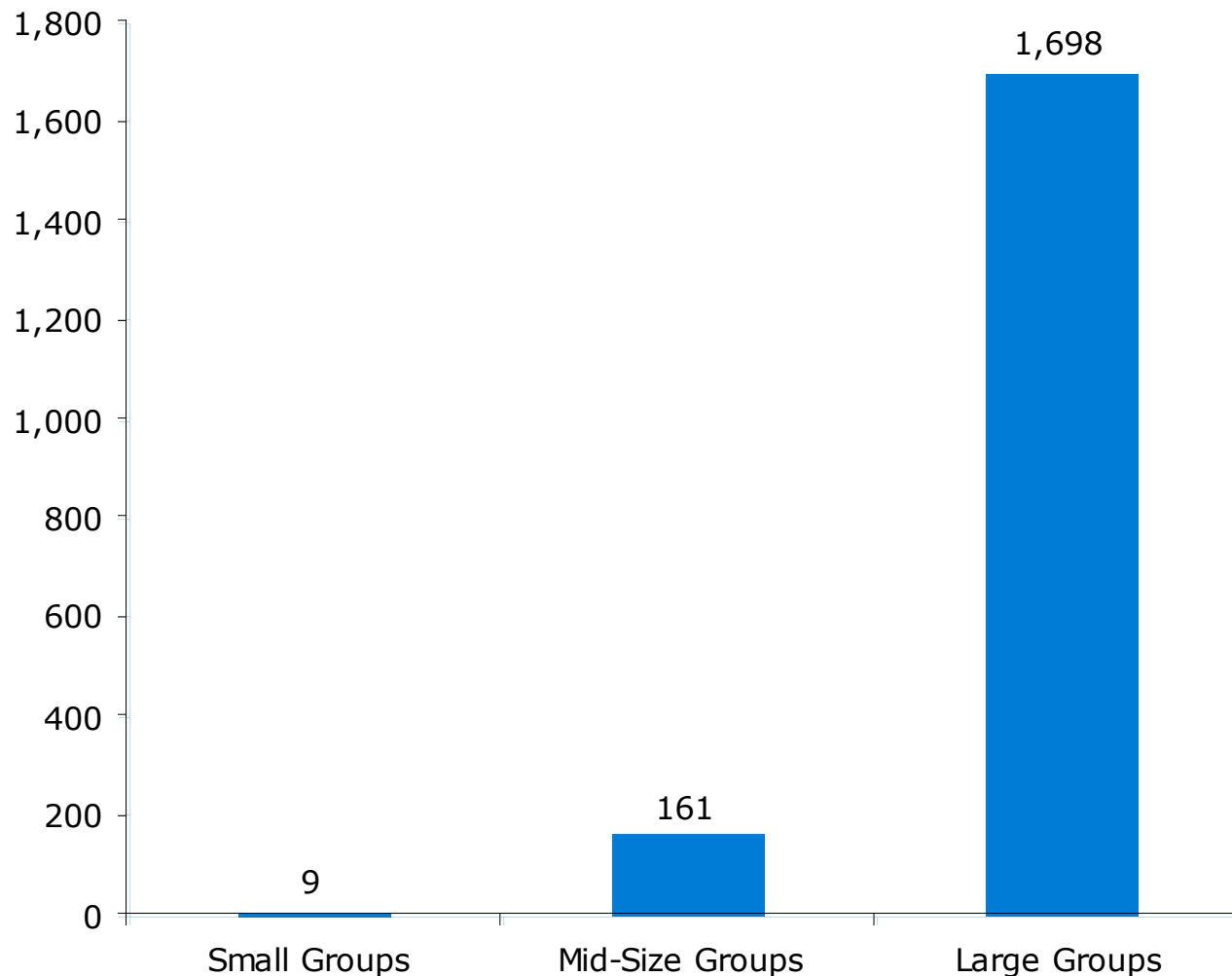
The component with the most significant difference between mid-size and large groups is commissions.



**Note:** This chart excludes data from a large Massachusetts HMO.

# Average Group Size by Market Segment

## 2006-2008



By its nature, the small group market has somewhat higher administrative expenses because coverage must be marketed to and administered for many more and smaller purchasing groups. Insurers also add higher risk and reserve charges to small group premiums. In addition, agent and broker commissions are generally higher in the small group market.

# Growth in Non-Medical Spending Per Member Per Month

## Estimated Average Annual Growth in Non-Medical Spending PMPM by Insurance Market Segment, 2006-2008

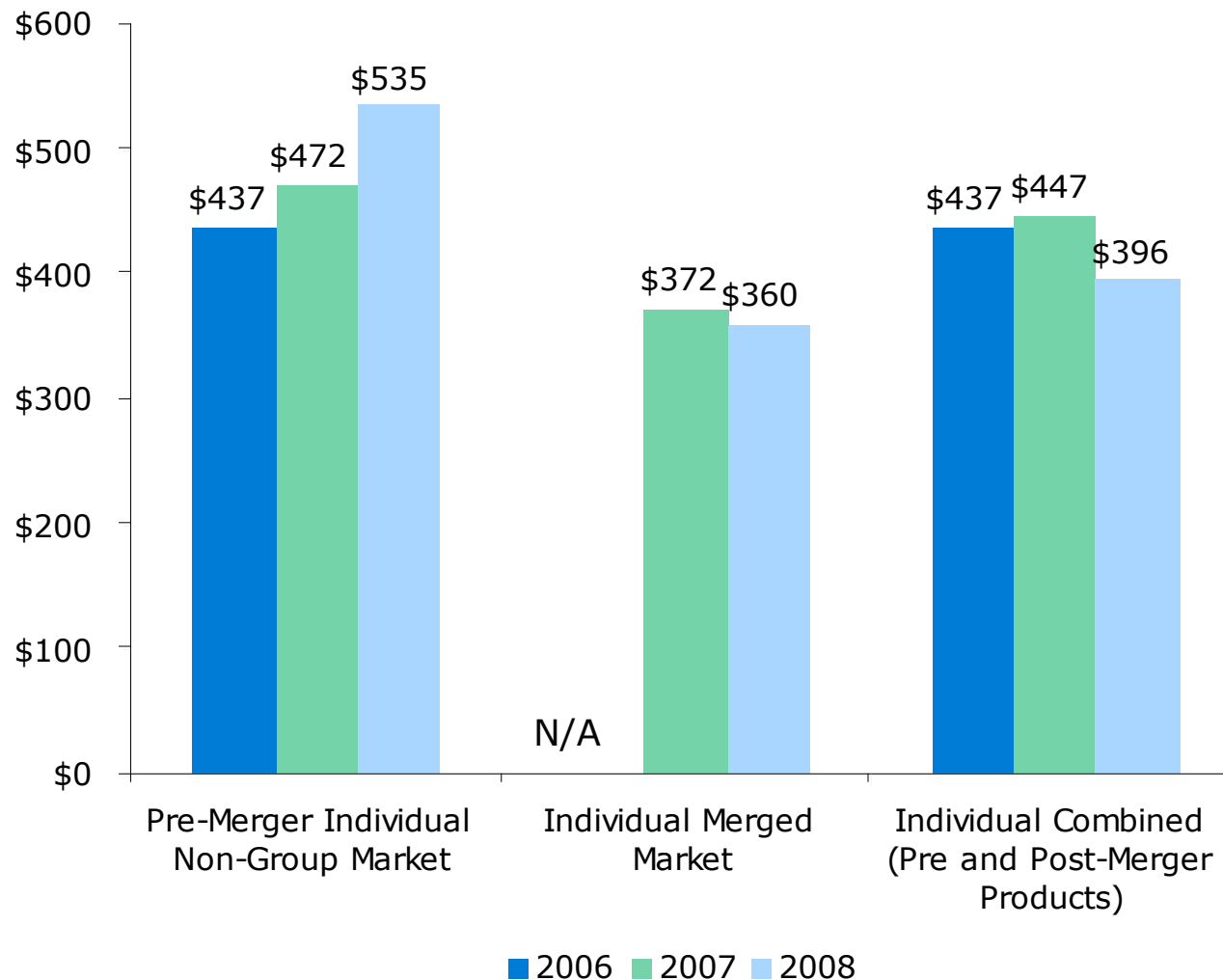
	2006 - 2007	2007 - 2008	Average Annual Growth Rates
Small Groups	5.1%	-4.2%	0.3%
Mid-Size Groups	-0.6%	2.4%	0.9%
Large Groups	-1.2%	10.1%	4.3%

**Growth in PMPM revenue devoted to non-claims expenses was greater for large groups than small or mid-size groups during the period from 2006 to 2008.**

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## **Preliminary Experience of the Merged Market**

# Average Private Insurance Premiums PMPM for the Individual Market



On July 1, 2007, as part of Chapter 58–Massachusetts’ landmark health reform law—the small group and non-group markets were merged. This means that rates for individual purchasers and small group purchasers are now part of the same rating pool and are charged premiums based on the same rating rules. Individuals enrolled in the non-group market prior to the merger were able to remain in a residual non-group market if they wished or could opt to select a new plan through the merged market.

**On average, premiums PMPM in the individual merged market in 2008 were 33% lower than premiums in the non-group market (\$360 versus \$535).** This is likely due to the inclusion of the individual market in the rating rules and risk pooling combined with the small group market, as well as the reduction in benefit richness among products sold to individuals through the merged market compared with the non-group market.

# Medical Expense Ratios by Market Segment

	2005 Expense Ratio	2006 Expense Ratio	2007 Expense Ratio	2008 Expense Ratio
Individual Pre-Merger	90.2%	95.3%	96.3%	95.4%
Individual Post-Merger Products	N/A	N/A	105.4%	112.0%
Individual Total	90.2%	95.3%	98.2%	107.5%
Small Group	84.3%	86.7%	86.6%	86.1%
<b>Merged Market Total</b>	<b>N/A</b>	<b>N/A</b>	<b>86.9%</b>	<b>88.1%</b>
<b>Mid-Size Group</b>	<b>85.1%</b>	<b>86.9%</b>	<b>87.7%</b>	<b>88.0%</b>
<b>Large Group</b>	<b>88.0%</b>	<b>89.1%</b>	<b>90.0%</b>	<b>89.6%</b>
Total	85.9%	87.7%	88.3%	88.6%

**Medical loss ratios for most market segments increased from 2005 to 2008.**

Under the merged market, insurers are not allowed to charge individuals purchasing coverage directly more than 115% of the lowest small group premiums. As a result, some insurers charge higher premiums to small groups in order to offset losses on their individual plans, as those individuals in the individual market are more likely to have more substantial health care needs.

**The proportion of premium dollars devoted to medical expenses is much higher, on average, for the individual market than for other markets.**

The individual post-merger products show a 2008 medical loss ratio of 112% compared to the small group loss ratio of 86%. The resulting medical expense ratio of the combined merged market is 88%—a two percentage point impact—consistent with predictions set forth in the market merger commission study in 2006.

**Note:** Individual Total and Small Group make up the Merged Market Total. Individual Total is made up of Individual Pre-Merger and Individual Post-Merger Products. The proportion of premium dollars devoted to medical claims for the individual segment, on average, is much higher than that of the small group segment. "Medical expense ratio" is the proportion of premium revenues devoted to medical claims expenses.

**Source:** *Report on the Impact of Merging the Massachusetts Nongroup and Small Group. Health Insurance Markets under Chapter 58 of the Acts of 2006.* Prepared for the Massachusetts Division of Insurance and Market Merger Special Commission by Gorman Actuarial, LLC, DeWeese Consulting, Inc., and Hinckley, Allen & Tringale LP. Available at: [http://www.mass.gov/Eoca/docs/doi/Legal\\_Hearings/NonGrp\\_SmallGrp/FinalReport\\_12\\_26.pdf](http://www.mass.gov/Eoca/docs/doi/Legal_Hearings/NonGrp_SmallGrp/FinalReport_12_26.pdf)



# Possible Unintended Consequences of Individual Market Reforms

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Some insurers have suggested that the higher medical loss ratios in the post-merger individual market may be due in part to adverse risk selection. Under the merged market rules, individuals typically can buy and drop health insurance at any time during the year. Before market reforms, individuals purchasing coverage through the non-group market could face waiting periods of up to six months. While insurers are still permitted to impose such waiting limits, if they choose to, they must apply those same standards across all plans. Up to this point, no insurers have chosen to impose waiting limit restrictions in the merged market.

However, some insurers report that individuals may be buying policies immediately before they incur significant medical expenses, and then terminating the coverage after the medical event and subsequent expenses occur. These anecdotes could not be investigated with the data obtained by the Division of Health Care Finance and Policy for this study, but merit further exploration.

**Note:** 211 CMR 66.07 allows insurers to implement pre-existing condition exclusions and/or waiting periods; however, insurers would need to apply the same rules to their entire merged market business, including their small group products. As a result, insurers have opted to not implement such provisions in their merged market products.

**Sources:** Massachusetts Division of Insurance Regulation 211 CMR 41.04. Available at: [http://www.mass.gov/Eoca/docs/doi/Legal\\_Hearings/211\\_41.PDF](http://www.mass.gov/Eoca/docs/doi/Legal_Hearings/211_41.PDF)

"A Costly Wrinkle in the Merged Market," Let's Talk Health Care Blog, Harvard Pilgrim Health Care, June 22, 2009. Available at:

<http://www.letstalkhealthcare.org/ma-health-reform/a-costly-wrinkle-in-the-merged-market/>

Stakeholder outreach meetings conducted by Division of Health Care Finance and Policy, May and June, 2009.



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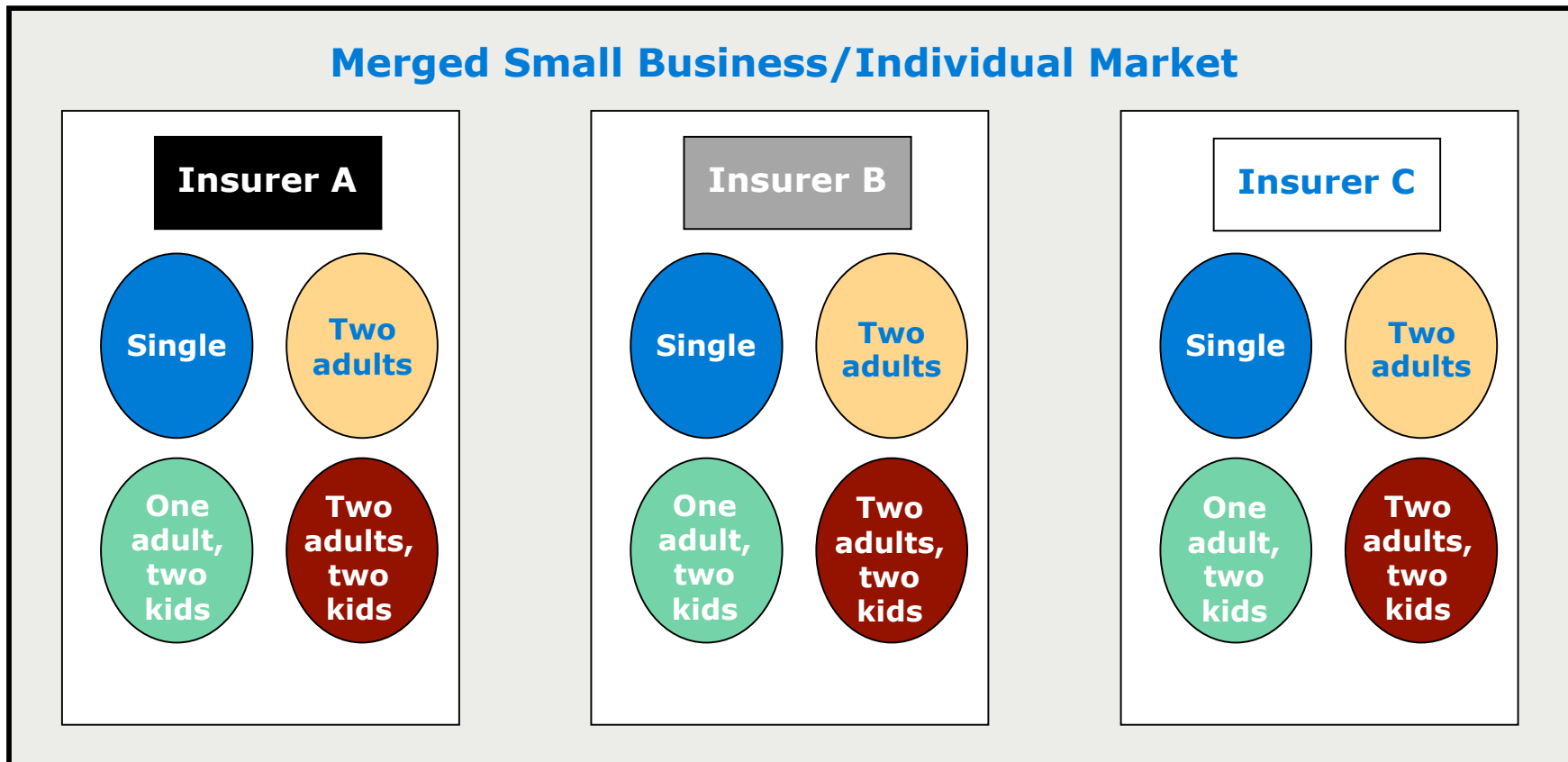
# **Appendix A**

## **Premium Pricing Rules in Massachusetts Merged Market**

# Explanation of the Premium Calculation for the Merged Small Business/Individual Market

First, each health insurer sets its own base rates for each subscriber type based on:

- Its own history of *claims experience*, not the experience of the entire market
- The unique make-up of its own *risk pool*
- A fixed amount for its own overhead costs (administration, commissions, broker fees, and reserves)



The premium calculation for every customer in each subscriber type—whether applying as an individual or through the small group market—will start with the same initial base rate.

Then, when a small business or individual applies for coverage, the insurer can **adjust each of its base rates** for that particular customer.

**RATING FACTOR NOTES:**

**AGE:** Insurance companies use five-year age bands (i.e., 40-44, 45-49, 50-54) to rate each member based on age.

**INDUSTRY:** Certain high-risk industries are given higher rates than low-risk industries to account for higher expected claims.

**WELLNESS PROGRAM:** insurers may charge reduced premiums to companies that offer a wellness program.

**GROUP PARTICIPATION RATE:** Companies with high participation receive lower rates.

**TOBACCO USE:** Insurers may charge smokers higher rates than non smokers.

**Base Rate adjusted by  
the customer's:**

- Age
- Industry
- Wellness Program
- Group Participation Rate
- Tobacco Use

**= Adjustment Factor**

**Insurer Base Rate \* Adjustment Factor  
= Intermediate Rate**

Each insurer will perform this calculation for each of its customers, and so will have many different "intermediate rates" for every subscriber category. **The intermediate rate must be** between 66% and 132% of the base rate.

Finally, the insurer makes the last adjustments. These factors can push premium rates outside of the 2:1 rate bands.

---

A particular plan from a given insurer may have a higher actuarial value (more benefits), and thus a higher premium.

The insurer can also alter the rate to match its claims experience with the specific subscriber type.

### Final adjustment based on:

- Richness of the chosen plan's **benefits**
- Customer's **subscriber type**
- **Region** (.8 to 1.2)
- **Group Size** (.95 to 1.1)

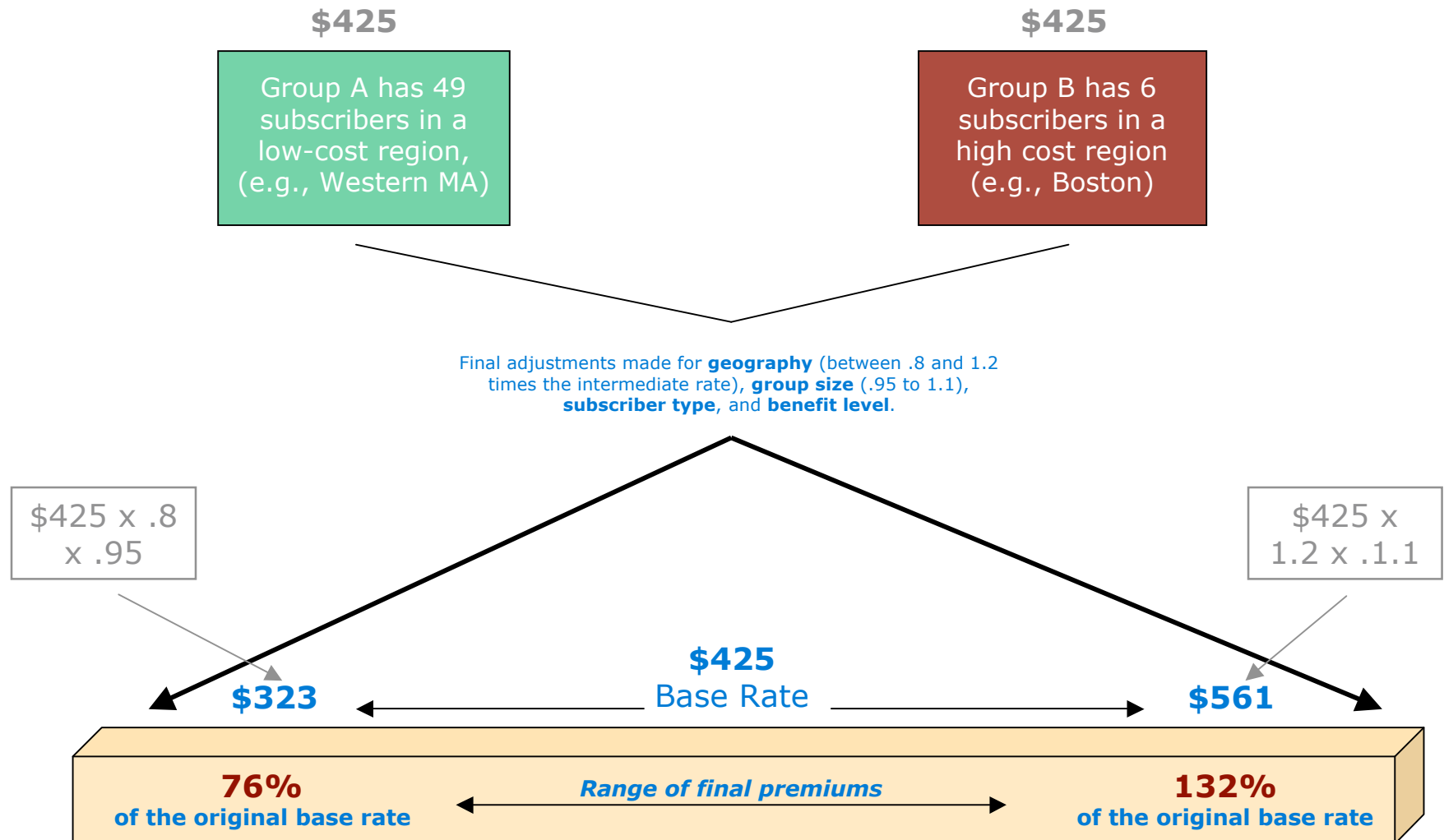
insurers can identify up to seven regions in the state based on local medical cost trends.

insurers may adjust for group size.

$$\text{Intermediate Rate} * \text{Final Adjustment} = \text{Premium}$$

# Hypothetical Premium Calculation #1

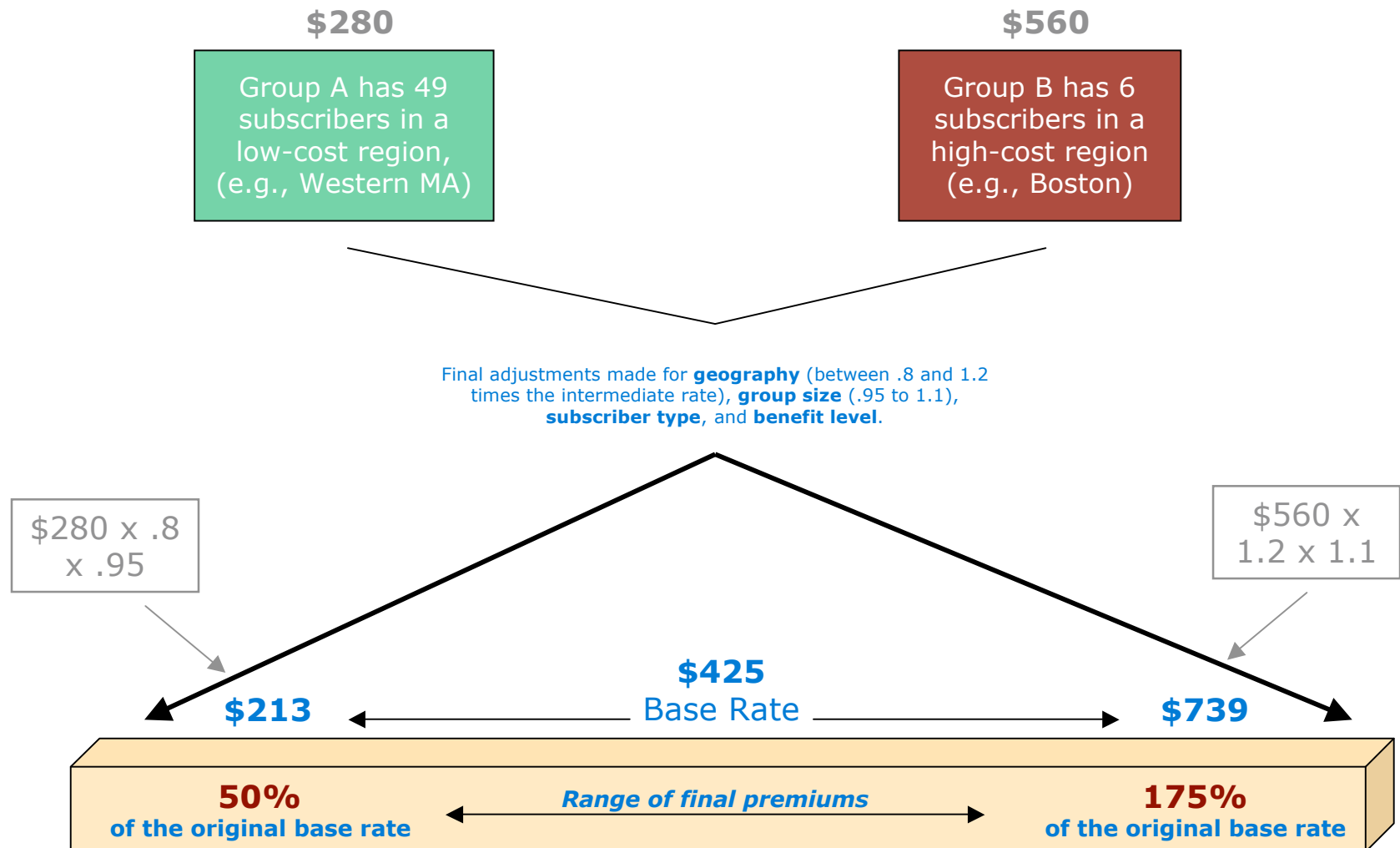
## Two Small Businesses with the Same Intermediate Rate: *The Effect of Geography and Group Size*



The final premiums will also take into account the customer's subscriber type (in this example "Two Adults") and the chosen plan's benefit level (actuarial value).

## Hypothetical Premium Calculation #2

Two Small Groups Start at the Extremes of the 2:1 Intermediate Rate Band  
*The makeup of the groups is a range of ages, industries, and participation rates*



The final premiums will also take into account the customer's subscriber type (in this example "Two Adults") and the chosen plan's benefit level (actuarial value).

---

# **Appendix B**

## **Premium Growth Volatility Examples**



# Examples of Premium Growth Variability: Results of Aging of Employees or Changes in Group Size

Scenario 1 – Company with 6 Employees	Rate Increase	Scenario 2 – Company with 20 Employees	Rate Increase
Rate increase if no change in employee composition (no employees age into higher age bands – Note: not probable for the average employer)	6.0%	Rate increase if no change in employee composition (no employees age into higher age bands – Note: not probable for the average employer)	6.0%
Rate increase if there is no change in employees; two employees age into next five-year age band	10.2%	Rate increase if there is no change in employees; six employees age into next five-year age band	10.7%
Rate increase if one employee of average age leaves the group, leaving the group with 5 members	15.8%	Rate increase if three employees of average age leave the group, leaving the group with 17 members	6.1%
Rate increase if one employee of average age leaves the group, resulting in a group of 5 employees AND a current employee ages from 29 years to 30 years	17.6%	Rate increase if three employees of average age leave the group, AND three current employees age from 24 to 25 years, 44 to 45 years, and 54 to 55 years	9.2%
Rate increase if one employee in early 60s retires and a 40-year-old replacement is hired	-5.3%	Rate increase if one employee retires and a 40-year-old replacement is hired	1.5%

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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.2b**

### **Premium Levels and Trends in Private Health Insurance Plans**

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## **Premium Levels and Trends in Private Health Insurance Plans**

**Prepared by Dianna Welch, FSA, MAAA,  
Oliver Wyman Actuarial Consulting, Inc.**

**February 2010**



Deval L. Patrick, Governor  
Commonwealth of Massachusetts  
Timothy P. Murray  
Lieutenant Governor

JudyAnn Bigby, Secretary  
Executive Office of Health and Human Services  
David Morales, Commissioner  
Division of Health Care Finance and Policy

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## Introduction

Massachusetts has higher health insurance premiums than the U.S. average, and for at least the past five years premiums have grown at a faster rate. Nationally, there have been at least three major consequences of fast-rising premiums. First, employee contributions to coverage have grown as employers strive to control benefits costs.<sup>1</sup> Second, high premium growth has discouraged job and employment growth, including especially the creation of jobs that offer health benefits.<sup>2</sup> Both trends have contributed to rising rates of uninsured.<sup>3</sup> Finally, employers and individuals have attempted to “buy down” coverage, purchasing insurance products that require greater cost sharing and less rich benefits with the obvious consequence of rising consumer out-of-pocket costs.

This report discusses findings related to beneficiary demographics in the Massachusetts commercial markets, and the non-medical expense charges and total premiums paid by those beneficiaries for health insurance.<sup>4</sup> The findings are based primarily on premium, claims, membership, and non-medical expense data by insurance market segment provided by health insurance carriers writing business in the Commonwealth.<sup>5,6</sup>

## A. Beneficiaries

The findings in this section are based on membership data provided by insurance carriers in Massachusetts and include both resident and non-resident members of Massachusetts policies. The data span calendar years that include the merging of the individual and small group markets under Massachusetts’ 2006 reforms. When findings appear to be influenced by the 2006 reforms, it is noted. Note that the purpose of this report is not to track the number of uninsured, but rather to analyze trends in premiums and claims of Massachusetts policies.

There were significant differences among populations in the various market segments. On average plan members in the individual segment were older than those in the group segments and covered fewer dependents per contract, including children under age 20.

### 1. Membership by Segment<sup>7</sup>

- Annual enrollment declined in all insured group segments from 2006 to 2008, but increased in the individual and self-insured segments. In 2008, approximately 70,000 members (individuals, workers, and dependents) were insured in the individual segment, 690,000 in small groups, 780,000 in mid-size groups, 540,000 in large groups, and 1,940,000 in self-insured groups (see Appendix, Figure A.1 and Table A.1). The size of each segment may differ slightly from other reported statistics.<sup>8</sup> This is apparently due to the exclusion of Commonwealth Care and one carrier with significant self-insured enrollment from the study. Furthermore, this report includes both resident and non-resident members of Massachusetts policies.
- The average size of insured small and large groups (measured as the number of subscribers per employer) decreased from 2007 to 2008. In contrast, the average size of self-insured

groups increased from 2006 to 2007. In 2008, on average, nine workers were insured in small groups, about 160 in mid-size groups, and nearly 1,700 in large groups. Self-insured employer groups included, on average, 4,150 enrolled employees (see Appendix, Figure A.2).<sup>9</sup>

- The average size of insured groups varied significantly among carriers. For example, across carriers in the small group segment, the average size of insured groups ranged from three to 29 in 2008 (data not shown).

## 2. Age and Gender

This section discusses the age and gender of each insurance segment. Age is an important factor in health insurance premiums because it impacts the claims experience of each segment, and is an allowable rating factor in all segments, though the use of age as a rating variable is limited in the individual and small group segments. Gender is also important due to its impact on the underlying claims experience. In addition, gender is an allowable rating factor in the mid-size group and large group segments, but not the individual and small group segments.

- The individual insurance segment was significantly older on average than the group segments (see Appendix, Figure A.3). The individual insurance segment covered relatively few children ages 0 to 19 (largely as dependents) and relatively more adults ages 60 to 64, potentially including early retirees not yet eligible for Medicare (Table A.2). The difference in average age between individual members and group members was enough to result in individuals being rated one (five-year) age band above group enrollees on average, with commensurately higher premiums.
- Despite the higher average age of the individual segment, there was significant membership in the 20 to 29 age band, many enrolled in Young Adult Plans for those ages 18 to 26. In 2008 there were, on average, just under 4,000 members enrolled monthly in Young Adult Plans.<sup>10</sup>
- In all insurance market segments, the average age of enrollees increased from 2006 to 2008, with small groups experiencing the largest (but still very small) increase—from 33.3 years in 2006, to 33.7 years in 2008 (see Appendix, Figure A.3).<sup>11</sup>
- With Massachusetts' insurance market reforms, the average age of adults ages 20 and older in the individual segment declined from 45 to 43 years old (data not shown). In part, this reflects a large increase in the number of members ages 20 to 29, which nearly doubled from 2007 to 2008. Nevertheless, while the average age of adults declined, the proportion of members ages 0 to 19 declined also. As a result, the average age of the individual segment as a whole was stable.
- The individual and large group segments cover a larger share of females than the small group and mid-size group segments (see Appendix, Table A.2).



### **3. Contract Size<sup>12</sup>**

- In each insurance market segment, the average size of enrolled families (measured as the number of members per contract) was generally consistent from 2006 to 2008 (see Appendix, Figure A.4). Only in the individual market did enrolled family size decline, suggesting that single adults accounted for a relatively large share of new enrollment.
- Consistent with fewer children in individual coverage, the average contract size was significantly greater in the group segments than in the individual segment. Within the group segments, the average contract size was greatest in the large group segment, and smallest in the small group segment.

### **4. Geographic Area**

- Geographic area is an important factor in determining health insurance premiums. All insurance segments allow premium rates to vary based on the location of the employer or covered members, though the individual and small group segments limit the variation permitted. The variation in premium typically reflects differences in the contractual reimbursement rates and underlying utilization of providers in the different geographic areas.
- Nearly half of large group members were covered through employer groups based in the Boston Metro area (see Appendix, Figure A.5).
- In contrast, small and mid-size employer groups, as well as individual enrollees, were more likely to be located outside of the Boston Metro area, in the Central, Metro West, Northeast, and the Southeast regions (including the Cape and Islands).

### **5. Industry**

- Industry is another important factor due to its use in setting premium rates. Industry is an allowable rating factor in all insurance segments. However, it is typically not used in the individual insurance segment.
- Government, education, and health services accounted for more than half of insured large group enrollees (54 percent) in 2008 (see Appendix, Table A.3).
- In contrast, small group enrollment was relatively concentrated in construction, retail, and several of the smaller service industries.

## **B. Non-Medical Expenses**

- In total, carriers used approximately 89 percent of 2008 premiums to fund claims on behalf of members. This proportion, called a loss ratio, was much higher in the individual market than in the group markets. The remaining 11 percent of premium, called retention, is the amount available for carriers to fund non-medical expenses and contributions to surplus or profit. In the individual insurance segment, loss ratios in post-merger individual products varied by carrier, ranging from 79 percent to 118 percent in 2008; most carriers experienced

loss ratios in excess of 100 percent in post-merger individual products, resulting in an average loss ratio of 112 percent in these products.

- Massachusetts reforms merged the individual and small group markets and limited the difference in premiums that can be charged to individuals and small groups. To offset losses on individuals, therefore, some carriers have needed to charge higher premiums to small groups. The amount of additional premium charged to small groups by a given carrier would depend on the claims experience of the individuals that are covered and the size of the carrier's individual enrollment relative to its small group enrollment.
- In the group market, loss ratios were slightly higher for large groups (by 3.5 percentage points) than for small groups. The difference between loss ratios in the merged market and large group market narrowed in 2008, reflecting a very high average loss ratio (112 percent) for individuals in 2008.
- In 2009, general administrative expense accounted for six to eight percent of premium across the segments (roughly 60 percent of the difference between premiums and claims, called pricing retention). Surplus or profit accounted for two to three percent of premium (25 percent of retention), and commissions accounted for one to three percent of premium (15 percent of retention).

## **1. Historical Administrative Expenses and Loss Ratios**

- Total administrative expenses per member per month (PMPM) increased from 2002 to 2006 at an average rate of 13.2 percent per year, and from 2006 to 2008 at an average rate of 1.9 percent per year, resulting in an average rate of 9.3 percent per year over the entire period (see Appendix, Table B.1)—similar to the growth in premium PMPM (data not shown).<sup>13</sup> While some administrative expenses may increase at the rate of premium (such as commissions, which are paid as a percent of premium), it is not expected that total administrative expenses would increase as fast as premium over the long term. In the most recent two years, administrative expenses grew more slowly than in previous periods and more slowly than the premium PMPM. Total administrative expenses PMPM grew 2.5 percent in 2007 and 1.4 percent in 2008.
- From 2002 to 2008, carriers used an average of 86 cents per dollar of premium to fund claims on behalf of members. On average, 88 cents of each dollar of premium was used to pay claims in 2008. Across carriers, this percentage ranged from 75 to 91 cents (see Appendix, Table B.2).
- While the small group loss ratio declined by 0.5 percentage points (from 86.6 percent in 2007 to 86.1 percent in 2008), claims exceeded premiums in the post-merger individual segment, increasing the merged market total loss ratio 1.2 percentage points (to 88.1 percent) from 2007 to 2008 (see Appendix, Table B.3 and Figure B.1).<sup>14</sup>
- The difference between merged market and large group loss ratios narrowed in 2008. In 2007, there was a 3.1 percentage point difference between the loss ratios of the merged market

(86.9 percent) and the large group segment (90.0 percent). In 2008, this differential shrank to 1.5 percentage points, largely reflecting an increase in the merged market loss ratio (to 88.1 percent). The higher merged market loss ratio was driven by the 112 percent loss ratio on individuals in 2008.<sup>15</sup>

- The individual and small group markets are merged with limitations on premium differences between individuals and small groups. Therefore, when losses on individual coverage occur, carriers may need to increase premiums for small groups as well as individuals. Reflecting the difference between the loss ratios for small groups and individuals in 2008, carriers would have had to increase small group premiums 2.3 percent in the merged market to achieve the same loss ratio they would have in a non-merged market. The impact on small group premiums would be larger if either (a) individuals become a larger proportion of the merged market, but the difference between small group and individual loss ratios persists; or (b) individuals continue to account for the same share of the market, but individual loss ratios increase relative to small group loss ratios. It is not known how much carriers actually increased their 2008 premiums due to the markets having been merged.

## 2. Carrier Pricing

- Pricing retention, the amount carriers charge to fund general administrative expenses, commissions, and contribution to surplus/profit (also equal to the difference between the premium charged and the expected claims expense), was generally higher for smaller group sizes, both as a percentage of premium and PMPM (see Appendix, Figure B.2).
- The difference in retention between small groups and large groups narrowed from 2006 to 2008. On average, retention PMPM grew faster for large groups (8.0 percent) than small groups (1.4 percent) from 2006 to 2008, driving a narrower retention differential (see Appendix, Table B.4).
- Retention was comprised of roughly 25 percent contribution to surplus or profit, 15 percent commissions, and 60 percent general administrative expense in all insured segments.
- In second quarter 2009, average self-insured fees were approximately \$26 PMPM, while average retention for insured groups ranged from roughly \$40 to \$50 PMPM (data not shown).

## C. Premium Trends

This section discusses premium trends by health insurance segment over the study period, focusing on three analyses: most popular benefit plans, lowest-cost benefit plans, and aggregate historical premium trends.

On average, large groups purchase richer benefits than mid-size or small groups. From 2006 to 2008, large group premiums consistently exceeded mid-size and small group premiums. When adjusted to equivalent demographics, geographic area, and benefits, smaller groups pay higher premiums and

have experienced higher average premium trends than mid-size and large groups. Premium increases for specific employers may vary significantly from the average.

### **1. Most Popular Plans**

- The most popular benefits were richer for groups than individuals, and richer for large groups than mid-size and small groups (see Appendix, Table C.1).
- Copayments generally increased from 2006 to 2008. For example, in the small group segment the median primary care physician (PCP) copayment increased from \$10 to \$20. Similarly, the actuarial value of the median plan decreased.<sup>16</sup> In the small group segment, the weighted average actuarial value declined from 0.90 at the beginning of 2005, to 0.87 at the end of 2008 (see Appendix, Table C.2).
- The most popular group plans generally included no deductibles, whereas the median most popular individual plan generally included a \$2,000 deductible.
- From 2006 to 2008, large group premiums for the most popular plan were generally higher than in other insurance market segments, reflecting richer benefits. Conversely, individual premiums were lower because benefits were less rich (see Appendix, Figure C.1).
- The large increase in individual premiums from first quarter 2008 to third quarter 2008 coincided with significant new entry of individuals into the merged market. Later entrants to the market apparently chose richer benefits than early entrants, driving up the median single premium. Two carriers reported a change in the most popular individual product at 2008 Q2, and another reported a change at 2008 Q3. For all three carriers, their most popular individual product became a richer benefit design. For example, one carrier's most popular individual product at 2008 Q1 included a \$2,000 deductible, while its most popular individual product at 2008 Q2 included only a \$1,000 deductible.
- Post-merger for individuals, average single premiums for the most popular products grew more than 30 percent annually as later entrants chose richer benefit designs. In contrast, average single premiums for the most popular group products grew by 6 to 8 percent.
- In each insurance market segment, family premiums were roughly 2.7 times the single premium in all years from 2006 to 2008 (data not shown).
- A somewhat larger percentage of members in small groups (17 percent) were enrolled in the most popular plan in 2008, compared with either mid-size groups (7 percent) or large groups (13 percent) (see Appendix, Table C.3). The percentage of small group members enrolled in the most popular plan declined from 30 percent at the beginning of 2005 to 17 percent at the end of 2008. Similarly in mid-size groups, enrollment in the most popular plan declined from 11 percent to 7 percent. Large group enrollment in the most popular plan increased slightly, from 12 percent to 13 percent.

## **2. Lowest-Cost Plans<sup>17</sup>**

- With the introduction of new low-cost plan options in 2007 and 2008, the median and high actuarial values of comprehensive lowest-cost products in all segments declined (see Appendix, Table C.4).
- In 2008, most of the lowest-cost options that would have met current Minimum Creditable Coverage (MCC) requirements included a \$2,000 deductible, the maximum allowable under the current MCC requirements if the plan is not eligible for a health savings account.<sup>18</sup>
- The lowest-cost small group premium fell markedly in July 2007, when carriers introduced new low-cost products in the newly merged market (see Appendix, Figure C.2). These new products may have been introduced as Bronze coverage products made available to individuals through the Health Connector's Commonwealth Choice program (as many of the carriers in the study participate in Commonwealth Choice) or for other strategic reasons. Commonwealth Choice product offerings are made available both through the Connector and to individuals and small employers through the carriers' other merged market distribution channels. Typically these new low-cost products were made available to larger groups as well.
- Small groups appear to have the lowest-cost options available since the market merged (see Appendix, Figure C.2). After the market merged, the median lowest-cost plan available to small groups was less than that available to mid-size or large groups. This was due in part to one carrier that did not offer its lowest-cost small group plan design to larger groups.<sup>19</sup>
- In each group insurance segment, the most popular plan was not the lowest-cost plan (see Appendix, Figure C.3). Only in the individual insurance segment were some carriers' lowest-cost plans also their most popular plans (data not shown).

## **3. Historical Premium Trends**

- Overall, individual premiums declined significantly in 2008 (from \$447 PMPM in 2007 to \$396 PMPM in 2008) due to the shift in membership toward lower-premium products in the merged market (see Appendix, Figure C.4). However, premiums for individuals in pre-merger products continued to increase.
- While the individual premiums for the most popular post-merger products increased at an annual rate of 30 percent due to an increase in benefits in these products, they represented only 17 percent of enrollment. On average, individual premiums in post-merger products decreased from 2007 to 2008.
- Among group segments, large groups paid the highest unadjusted premium PMPM and saw the greatest premium growth from 2006 to 2008 (see Appendix, Table C.5).
- Average benefits among large groups increased slightly from 2006 to 2008 (by less than one percent), as large group enrollment fell nearly 11 percent.

- In general, carriers charge small groups greater premiums for the same or equal benefits, compared with larger groups with similar demographics. (see Appendix, Table C.5) In 2008, small group premiums PMPM, adjusted to consistent demographics, geographic area, and benefits, exceeded mid-size group premiums by 4.9 percent and exceeded large group premiums by 5.8 percent. Of the 5.8 percent difference in premiums between the small group and large group segments, 3.7 percentage points were due to higher claims expense, and 2.1 percentage points were due to higher retention expense (derived from data shown in Figure C.5).<sup>20</sup>
- The trend in adjusted premiums was higher for small groups than mid-size or large groups (see Appendix, Table C.5).<sup>21</sup> From 2007 to 2008, the adjusted premium trends averaged 5.8 percent, 4.8 percent, and 5.4 percent, respectively for small groups, mid-size groups, and large groups.<sup>22</sup>

#### **4. Variation in Premium Trends**

- For any specific employer group, premium trends might vary substantially from the average. Premium volatility due to changes in subscriber demographics can be especially large for small groups, where each subscriber represents a significant percentage of the total group. For example, if two employees in a sample six-subscriber small group age into a higher age band, premiums could rise 10 percent at renewal, nearly four percentage points more than a six-percent baseline premium trend (see Appendix, Table C.6).
- Premium volatility also may occur due to changes in the number of enrolled subscribers in the group because most carriers vary premium rates based in part on the size of the group. For example, if an employee of roughly average age with single coverage leaves the sample six-subscriber small group and another employee with family coverage ages into the next five-year age band, both single and family premiums for the group could increase nearly 18 percent at renewal, nearly 12 percentage points above a six-percent baseline premium trend.
- Constructing realistic scenarios illustrates how much premium volatility can vary for small groups of different sizes as a result of rating rules and practice in the small group segment. In Scenario 1 (see Appendix, Table C.6), roughly 30 percent of the employees in a six-subscriber group and a 20-subscriber group, respectively, age into a higher age band. The impact of this change on each group is similar because premium adjustments for age do not vary based on the size of the small group. However, if the average age in either group is significantly higher or lower than the average among all small groups, either group could experience additional variation due to rating band limitations in the small group segment. In Scenarios 2 and 3, each employer loses roughly 15 percent of employees. The six-subscriber group is charged a higher premium based on the new, smaller size of the group, but the 20-subscriber group is not affected because the size adjustment for a 17-subscriber group is often the same as a 20-subscriber group. Scenario 4 shows that some groups will experience rate increases less than the average, for example, due to the retirement of an employee who is replaced by a younger worker.



- Finally, premium increases may vary from the average when a carrier changes its rating factors (for example, for geographic area or industry) or its product design relativities (for example, a carrier may increase the cost of a specific product design, such as its \$10 office visit copayment product design, by an amount that is higher or lower than its baseline premium increase, while other product designs may receive only the baseline premium increase). Carriers periodically review rating factors and may realign them to more closely reflect the difference in cost experience or competitive pressures. In that case, only employer groups insured by that carrier in that geographic area or industry or with that product design would experience the change. For example, between April 2007 and April 2009, most carriers changed their geographic area factors in the small group segment. The premium impact by region varied from -2.5 percent (in the West) to +1.1 percent (in Metro West), on average across all carriers in the region. However, groups covered by specific carriers in certain geographic areas experienced premium impacts ranging from -14.2 percent to +20.4 percent due to changes in geographic area factors over the two-year period.

## Methodology and Process

Oliver Wyman developed Section I of a data request that was reviewed by the Division of Health Care Finance and Policy (DHCFP) and its consultants and forwarded to the participating carriers. The carriers were selected based on membership volume as reported to DHCFP. This data request specified the content for data containing premium, claims, membership, and pricing data. For this study, we requested that carriers provide data on their commercial medical products for all group sizes including individuals. Products that are specifically excluded from this study are: Medicare Advantage, Commonwealth Care, Medicaid, Medicare supplement, FEHBP, and non-medical (e.g., dental) lines of business.

Carriers that responded to the data request included the following:

- Aetna Health, Inc.
- Aetna Life Insurance Company
- Blue Cross Blue Shield of Massachusetts, Inc.
- Blue Cross Blue Shield of Massachusetts HMO Blue, Inc.
- CIGNA HealthCare of Massachusetts, Inc.
- ConnectiCare of Massachusetts, Inc.
- Fallon Community Health Plan
- Harvard Pilgrim Health Care, Inc.
- Health New England, Inc.
- Mid-West National Life Insurance Company of Tennessee

- Neighborhood Health Plan
- The Chesapeake Life Insurance Company
- The MEGA Life and Health Insurance Company
- Tufts Associated Health Maintenance Organization, Inc. (d/b/a Tufts Health Plan)
- UnitedHealthcare of New England, Inc.

Oliver Wyman's initial analysis of the data revealed issues with several of the datasets provided. After further investigation by Oliver Wyman and the carriers, some of the datasets were re-run and sent to Oliver Wyman.

Oliver Wyman analyzed the data for each company separately. Additional investigation revealed that several datasets had incomplete or inconsistent data even after several attempts to obtain explanations or revised data from the carriers. Because of these data issues, certain carriers are excluded from certain sections of the analysis. We have maintained a consistent set of carriers within each analysis to ensure comparability of results (unless otherwise noted). For example, within the historical premium trends analysis (section C.3) a common set of carriers was maintained throughout the analyses in that section.

### **Beneficiaries**

The beneficiaries described in the Beneficiaries section may reside inside or outside of Massachusetts. Most often beneficiaries are located outside of Massachusetts when they are covered by an employer that is located in Massachusetts but the covered employee works in a location outside of Massachusetts. These out-of-state beneficiaries have been included in all sections of this report for consistency with the premiums reported, which also include the out-of-state beneficiaries. For this section, we requested detailed membership data from the carriers for their fully insured business. For self-funded business, we requested only total member months by calendar year and the average employer size. In this section, we summarize the distribution of members by market segment.

### **Most Popular Plan Analysis**

We asked the carriers to provide us with the most popular plan, based on membership volume, in each calendar quarter for each market segment. It is important to note that the most popular plan can be different in one market segment than another. Therefore, a portion of the difference in premiums for the most popular plan between segments can be attributed to differences in benefits.

We calculated an actuarial value for each of the plan designs provided. We did this by running each benefit design through our proprietary pricing model. Our model was calibrated to reflect the average claim level of the market in 2008. We calculated plan relativities by dividing each plan premium from the model by the plan premium for the richest plan that we reviewed.



To calculate the single and family premiums for the most popular plan, we asked the carriers to provide their base rates for the applicable plans and the rating factors that they apply to the base rates in order to generate a final premium rate. We also created a sample census for each segment that closely resembles the overall membership of the segment. For the individual segment, we selected an age and gender that was representative of the average of a group of individuals rather than basing the analysis only on one age and gender. Because the sample census is different for each segment, the premiums for the most popular plan differ by segment in part due to the differences in age, gender, and average contract size of the population. Among the three group segments, the populations are very similar in average age and gender. However, the populations reflect the slightly higher average contract size for larger groups. For example, large group premiums for most carriers are about two percent higher than mid-size group premiums due to the increased average contract size.

We assumed that all segments had an industry rating factor of 1.0, consistent with the average. We excluded pre-merger individual products from this analysis. The premiums reflect the Boston region.

### **Lowest-Cost Plan Analysis**

The methodology for performing the analysis of the lowest-cost plan was similar to the methodology for the most popular plan. The primary difference was in the selection of the plan design. We asked the carriers to provide the lowest-cost plan offered to each market segment in each calendar quarter during the study period. In most cases, the lowest-cost plan is the same across all market segments for a given carrier. Therefore, the difference in premium is primarily driven by differences in the sample censuses, and differences in rating practices by the carriers across market segments. There is, however, one carrier whose lowest-cost plan differs by market segment for a portion of the study period.

### **Non-Medical Expenses**

In 2008, Oliver Wyman produced a report for the Division of Insurance entitled “Analysis of Administrative Expenses for Health Insurance Companies in Massachusetts.” The analysis was performed using published annual financial statements. Non-medical expenses include: (1) general administrative expenses, (2) contribution to surplus or profit, and (3) broker commissions. Medical spending includes payments for covered health care services. Services such as disease management and case management may be categorized within either medical or non-medical spending. We have updated the analysis that was completed for the Division of Insurance study with data from the 2008 annual statutory financial statements of the applicable companies.

For the carrier pricing analysis, we asked the carriers to provide their pricing retention and its components as a percentage of premium and as an amount PMPM. Some carriers only provided the retention in one format. In these cases, we used the reported premiums and membership to estimate the other format. We note that some carriers were unable to provide a reliable estimate of the components of retention by segment and were not included in this analysis.

### **Historical Premium Rate Analysis**

We asked the carriers to provide their annual premiums by market segment for 2005 through 2008. We also asked the carriers to provide their rating factors that were in use in second quarter 2007 (just prior to the merger of the individual and small group markets) and currently, as well as member months by age, gender, contract type, area, group size, and industry. Using the annual premiums and aggregate annual member months, we were able to calculate unadjusted premiums PMPM.

Next, we adjusted the annual premiums by age and gender, area, and benefits. We did not adjust by industry because we were missing industry classifications for a large part of the membership.

We performed each adjustment by first adjusting the rating factors of each carrier to make each carrier's factors relative to a common demographic. For example, we made the age/gender factors relative to a 45-year-old male by recalculating each carrier's factors to be equal to the factor provided divided by the 45-year-old male factor for that carrier. We made the area factor relative to Boston. We then calculated the weighted average adjusted rating factor for each calendar quarter. Then we calculated a weighted average factor for each calendar year.

Generally, in calculating the annual weighted average factor we used the factors in effect during second quarter 2007 for the first two quarters of 2007 and prior, and the current factors for the last two quarters of 2007 and later, provided the change in the factor was not dramatic. Finally, we divided the unadjusted premiums for each carrier by the average rating factors to develop expected premiums PMPM, adjusted to the demographics represented by the 1.0 factors.

We note that for this analysis, we applied the rating factors to mid-size and large groups that would apply if the premium were based only on a manual rate and not on the group's own experience. In the market, actual premiums would be based on a combination of the manual rate and an experience rate with the proportion of each depending on the group's size. The largest groups are typically rated based entirely on their own experience. Therefore, we are making the assumption that actual experience will follow the claim pattern assumed in the manual rating factors. Actual premiums may differ.

Finally, we excluded the individual market from the adjusted premium analyses. Several carriers did not provide the necessary data to complete the analysis, and this was not the primary focus of the report.

Adjusting the premiums for benefits required a separate analysis from the one described above for the other rating factors. In the mid-size and large group segments, carriers generally allow groups to customize their benefit designs. This leads to a volume of unique benefit designs that is not feasible to analyze in the manner that was done for other rating factors. To estimate the average benefit relativities, we relied on the claims data that was provided in response to Section II of the data request. We note that because Section II claims were only provided for members that are residents of Massachusetts, there are some members included in our premium analysis for whom there is no claims experience available. In addition, since Section II claims data were provided only for calendar years 2006 through 2008, we had to limit the premium analysis to

that same time period. Finally, any carriers that were excluded from the claims analysis because of data issues with the Section II claims data were also excluded from this analysis. For each carrier and each calendar year we calculated the ratio of paid claims to allowed claims, which provides a measure of the amount of claims that are paid by the carrier. We then used the Oliver Wyman proprietary pricing model to estimate the actuarial value of benefits for a given paid to allowed claims ratio. We divided the unadjusted premiums by the estimated actuarial values to determine the premiums adjusted for benefits.

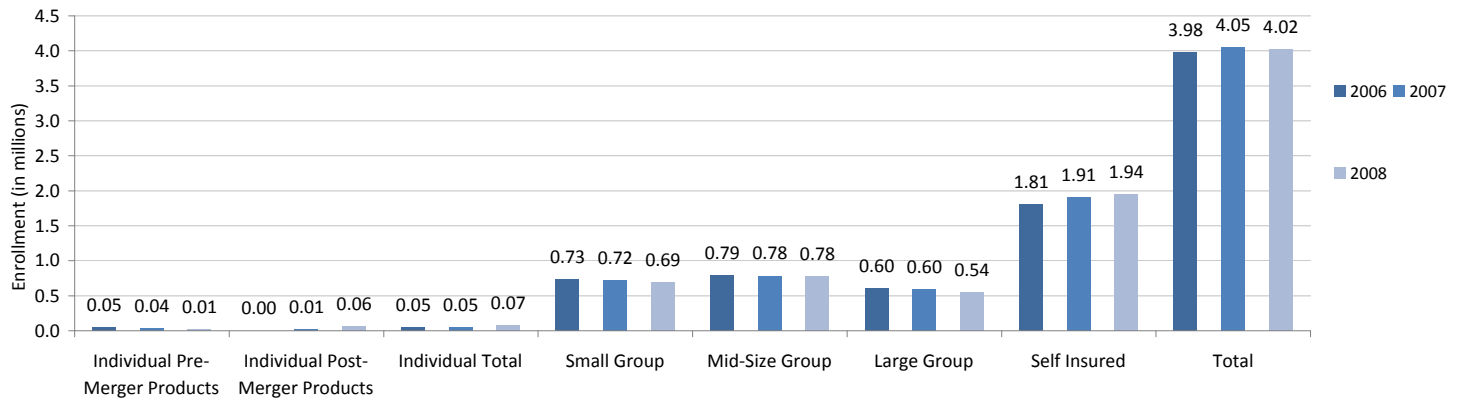
## Endnotes

- <sup>1</sup> From 2005 to 2008, employee contributions to (single) coverage in Massachusetts increased 21 percent across all firm sizes, and 35 percent among employees in firms with fewer than 50 employees. See: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, State and Metro Level Data [Available at: [http://www.meps.ahrq.gov/mepsweb/survey\\_comp/Insurance.jsp](http://www.meps.ahrq.gov/mepsweb/survey_comp/Insurance.jsp)].
- <sup>2</sup> See, for example: Katherine Baicker and Amitabh Chandra, The Labor Market Effects of Rising Health Insurance Premiums. *Journal of Labor Economics* 24(3), 2006: 609-634.
- <sup>3</sup> See, for example: Philip Cooper and Barbara Schone, "More Offers, Fewer Takers for Employment-Based Health Insurance: 1987 and 1996," *Health Affairs* (November/December 1997): 142-149.
- <sup>4</sup> For purposes of this report, commercial markets include individual and group insurance, both insured and self-insured. Medicare Advantage, Medicare supplement, Medicaid, Commonwealth Care, and non-medical lines of business are excluded.
- <sup>5</sup> Oliver Wyman prepared the information presented in this report for the sole use of the Massachusetts Division of Health Care Finance and Policy (DHCFP). Distribution to parties other than DHCFP does not constitute advice by Oliver Wyman to those parties. This report should not be distributed to other parties unless it is distributed in its entirety. The reliance on any aspect of this report by parties other than DHCFP is not authorized by Oliver Wyman and is done at their own risk.
- <sup>6</sup> The analysis in this report relies on extensive premium, claims, and membership data submitted by the major Massachusetts health plans. These data were reviewed for reasonableness, but they were not audited. Of course, to the extent the data are incomplete or inaccurate the findings are compromised. When not consistent across years, membership data provided by some carriers were eliminated from the analysis. Participating carriers for most analyses included: Aetna Health, Inc., Aetna Life Insurance Company, Blue Cross Blue Shield of Massachusetts, Inc., Blue Cross Blue Shield of Massachusetts HMO Blue, Inc., CIGNA HealthCare of Massachusetts, Inc., ConnectiCare of Massachusetts, Inc., Fallon Community Health Plan, Harvard Pilgrim Health Care, Inc., Health New England, Inc., Mid-West National Life Insurance Company of Tennessee, Neighborhood Health Plan, The Chesapeake Life Insurance Company, The MEGA Life and Health Insurance Company, Tufts Associated Health Maintenance Organization, Inc. (d/b/a Tufts Health Plan), and UnitedHealthcare of New England, Inc.
- <sup>7</sup> Throughout this report, insurance segments labeled as "small group" exclude individuals in the merged market. When individuals and small groups have been combined, they are referred to as the "merged market." The insurance segments are defined as follows: Individuals are those who purchase coverage directly (not through an employment relationship); small groups are those with one to 50 eligible employees (and are defined by Massachusetts Division of Insurance Regulation 211 CMR 66.04); mid-size groups are those with 499 or fewer enrolled employees, and do not meet the definition of a small group; large groups are those with 500 or more enrolled employees.
- <sup>8</sup> DHCFP, *Health Care in Massachusetts: Key Indicators*, May 2009 shows an increase in private enrollment of 190,000 members from June 30, 2006 to December 31, 2008. This report is available at [http://www.mass.gov/Eeohhs2/docs/dhcfp/r/pubs/09/Key\\_Indicators\\_May\\_09.pdf](http://www.mass.gov/Eeohhs2/docs/dhcfp/r/pubs/09/Key_Indicators_May_09.pdf).
- <sup>9</sup> The increase in the average size of self-insured groups from 2006 to 2007 was driven primarily by a large increase in the average size of one carrier's self-insured groups. Of the six carriers included in this analysis, two experienced a decrease in average self-insured group size from 2006 to 2007 while the other four experienced increases in average self-insured group size.
- <sup>10</sup> This estimate is based on monthly enrollment as reported in the Commonwealth Health Connector Board meeting materials obtained from: <http://www.mahealthconnector.org/portal/site/connector/menuitem.be34eb79b090a7635734db47e6468a0c/?fiShown=default>; Accessed 7/28/2009.
- <sup>11</sup> Others have noted the "graying" of private group insurance nationally and the resulting impact on premiums. See: Patricia Seliger Keenan, David M. Cutler and Michael Chernew. The 'Graying' of Group Health Insurance. *Health Affairs* 25(6), 2006: 1497-1506 [Available at: <http://content.healthaffairs.org/cgi/content/full/25/6/1497>].
- <sup>12</sup> "Contract" is synonymous with "subscriber." The average contract size is the number of subscribers and dependents covered per subscriber.
- <sup>13</sup> The growth in premium PMPM and Tables B.1 and B.2 are derived from Massachusetts carriers' annual statutory financial statements for comprehensive major medical products.
- <sup>14</sup> A number of factors could explain changes in insured-market loss ratios following reform—including carrier pricing to preserve (or expand) share in the newly merged market; pent-up demand among individuals who gained coverage; opportunistic, enrollment among individuals who take individual coverage to cover immediate health care needs and then drop it; and/or "cherry picking" into the self-insured market. Exploring whether any or all of these occurred was beyond the scope of this study.

- <sup>15</sup> Rating regulations that apply to the merged market limit the difference in premium that can be charged based on group size. The highest rating factor allowed for group size is approximately 16 percent higher than the lowest factor. Consequently, carriers that are using the maximum rate differential cannot further increase premiums charged to individuals without also increasing premiums charged to small groups.
- <sup>16</sup> The actuarial value is a measure of the relative richness of a benefit plan. All else equal, the higher the actuarial value, the lower the patient's cost sharing. In this analysis, the actuarial value for the richest plan offered by any carriers submitting data was set equal to 1.00. This plan included very little patient cost sharing.
- <sup>17</sup> The plans discussed in this section were the lowest-cost plans offered in each market segment, but they do not necessarily have membership in each market segment.
- <sup>18</sup> Carriers were asked to limit their responses to questions about product offerings to those that would have met the 2009 MCC requirements. The plan with the \$3,000 deductible was included because it is HSA compatible and therefore meets the MCC requirements. It is unclear whether all carriers considered their HSA plan options when determining the lowest-cost plan.
- <sup>19</sup> Note that this lowest-cost plan is not reflected in Table C.4; that is, this carrier's plans were not the minimum, median, or maximum lowest-cost plans in any segment.
- <sup>20</sup> Note that no explicit adjustments have been made to reflect differing retention percentages by benefit design. At least one carrier in the study applies different retention percentages to different benefit designs. This is likely a reflection of fixed administrative expenses, such as the cost of group and member enrollment, that do not vary by benefit design and therefore would represent a larger percentage of premiums for less rich benefit plans than more rich plans.
- <sup>21</sup> As codified in 211 CMR 66.08, individuals in the merged market may be charged up to 15.8 percent more than small groups with similar demographics. The allowable group size range is 0.95 to 1.10. On a percentage basis, the range from 0.95 to 1.10 is equal to a premium difference of 15.8 percent.
- <sup>22</sup> Trend rates were calculated using un-rounded PMPM amounts and not the rounded amounts shown in Table C.5.

## **Appendix**

**Figure A.1: Enrollment in Private Comprehensive Health Insurance Products by Insurance Market Sector, 2006-2008**



**Table A.1: Total Member Months and Distribution of Enrollment in Private Comprehensive Health Insurance Products, 2006-2008**

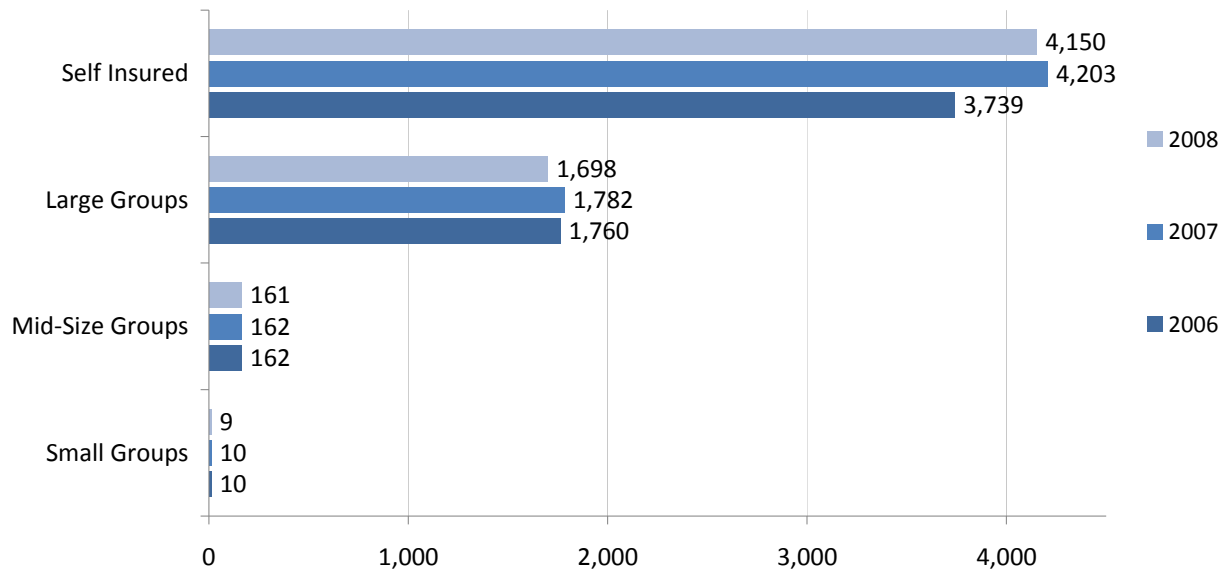
	2006		2007		2008	
	Member Months (in millions)	Percent of Member Months	Member Months (in millions)	Percent of Member Months	Member Months (in millions)	Percent of Member Months
Individual	0.6	1.3%	0.6	1.2%	0.9	1.8%
Small Group	8.7	18.3%	8.6	17.7%	8.2	17.1%
Mid-Size Group	9.5	19.9%	9.4	19.3%	9.3	19.3%
Large Group	7.2	15.1%	7.1	14.7%	6.5	13.5%
Self Insured	21.7	45.4%	22.9	47.1%	23.3	48.4%
Total	47.8	100.0%	48.6	100.0%	48.3	100.0%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

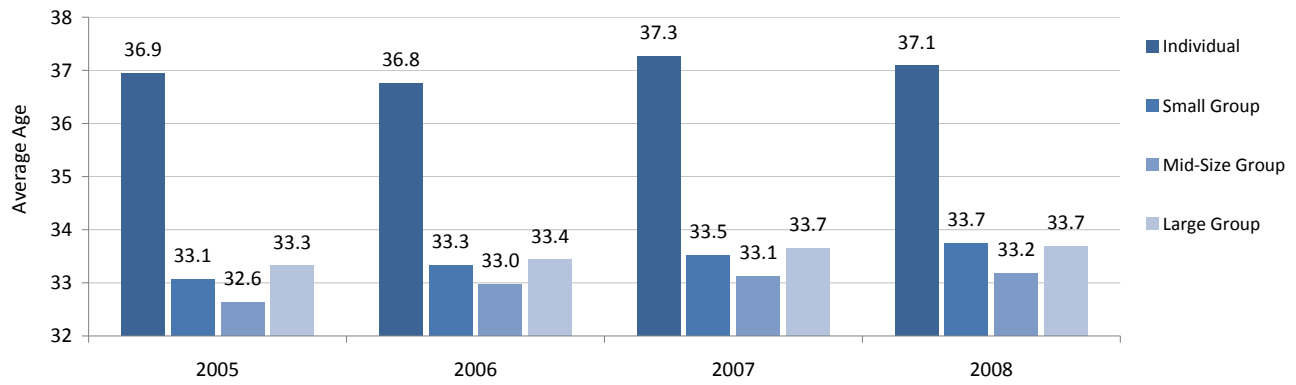
Note: Average group size is based on the number of enrolled subscribers (employees) per employer group.



**Figure A.2: Average Group Size by Insurance Market Sector, 2006-2008**



**Figure A.3: Average Age in Private Comprehensive Health Insurance Products by Insurance Market Sector, 2005-2008**



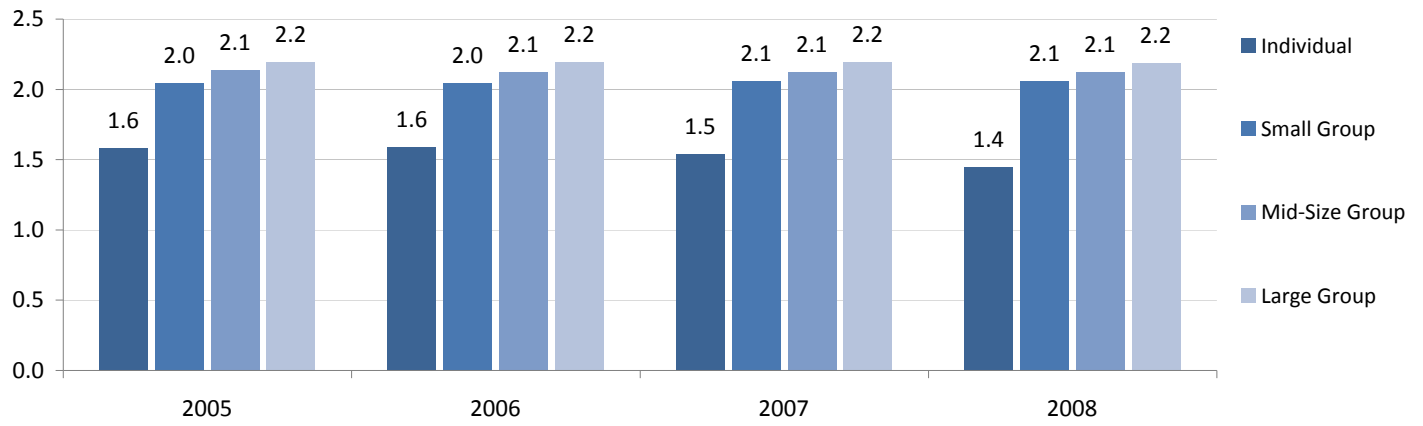
**Table A.2: Percent Distribution of Enrollment in Private Comprehensive Health Insurance Products by Age and Gender, 2008**

Age	Individual			Small Group			Mid-Size Group			Large Group		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total	47.3%	52.7%	100.0%	51.1%	48.9%	100.0%	49.4%	50.6%	100.0%	47.6%	52.4%	100.0%
0-19	9.2%	8.8%	18.0%	14.2%	13.6%	27.8%	14.3%	13.6%	27.9%	14.4%	13.7%	28.1%
20-29	9.7%	9.2%	18.8%	7.0%	6.4%	13.4%	6.7%	7.5%	14.2%	6.2%	7.5%	13.7%
30-39	7.6%	7.6%	15.2%	7.4%	7.2%	14.6%	8.0%	8.5%	16.5%	7.1%	8.3%	15.4%
40-49	8.5%	8.8%	17.3%	10.3%	10.0%	20.3%	9.4%	9.8%	19.2%	8.5%	9.8%	18.2%
50-59	7.7%	9.9%	17.7%	8.7%	8.4%	17.1%	7.5%	7.9%	15.5%	7.5%	8.9%	16.3%
60-64	4.2%	7.7%	11.9%	2.9%	2.9%	5.8%	2.3%	2.4%	4.7%	2.6%	3.0%	5.6%
65+	0.4%	0.7%	1.0%	0.6%	0.5%	1.1%	1.1%	0.9%	2.1%	1.4%	1.2%	2.6%
Average Age	35.4	38.6	37.1	33.7	33.8	33.7	33.0	33.4	33.2	33.1	34.2	33.7

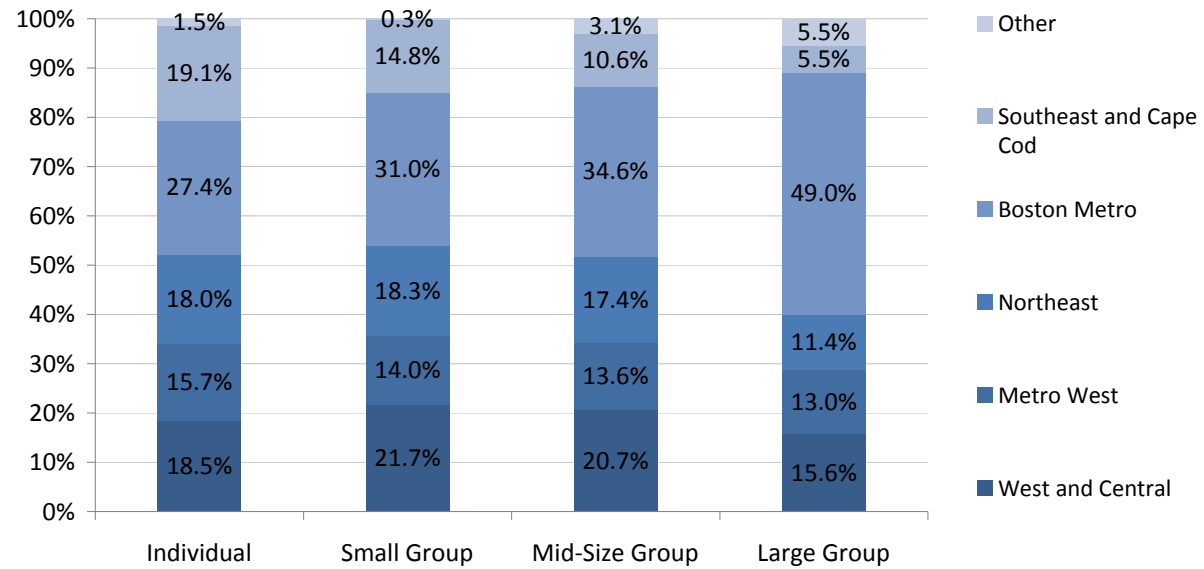
Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Note: Enrollment is measured as member months.

**Figure A.4: Average Number of Members per Contract, 2005-2008**



**Figure A.5: Percent Distribution of Enrollment in Private Comprehensive Health Insurance Products by Region, 2008**



**Table A.3: Percent Distribution of Enrollment in Private Comprehensive Health Insurance Products by Industry, 2008**

Industry Classification	Small Group	Mid-Size Group	Large Group
Agriculture, Forestry and Fishing	1%	0%	0%
Mining	0%	0%	0%
Construction	9%	3%	1%
Manufacturing	7%	13%	7%
Transportation, Communications, Electric, Gas, Sanitary Services	3%	4%	3%
Wholesale Trade	4%	3%	0%
Retail Trade	10%	7%	4%
Finance, Insurance and Real Estate Services	8%	7%	10%
	57%	55%	48%
<i>Business Services</i>	13%	15%	8%
<i>Health Services</i>	7%	11%	15%
<i>Legal Services</i>	4%	2%	4%
<i>Educational Services</i>	1%	7%	15%
<i>Social Services</i>	3%	6%	1%
<i>Membership organizations</i>	13%	2%	0%
<i>Engineering, accounting, research, etc.</i>	10%	8%	4%
<i>Other Services</i>	6%	4%	1%
Public Administration	0%	5%	24%
NonClassifiable Establishments	0%	2%	1%
Total	100%	100%	100%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Notes: Enrollment is measured as member months. Industry classification code was not provided for approximately 30 percent of the membership. Small group service enrollment in membership organizations (13 percent) purchase coverage through intermediaries.

**Table B.1: Administrative Expenses Per Member Per Month  
for Comprehensive Major Medical Products, 2002-2008**

	2002	2003	2004	2005	2006	2007	2008	Average, 2002 - 2008
Aetna Health Inc PA Corp	\$26	\$34	\$34	\$33	\$40	\$35	\$39	\$35
BCBS of MA	\$26	\$32	\$31	\$47	\$57	\$59	\$57	\$36
BCBS of MA HMO Blue Inc	N/A	N/A	N/A	\$31	\$33	\$36	\$39	\$34
BCBS of MA Consolidated	\$26	\$32	\$31	\$34	\$38	\$40	\$43	\$35
CIGNA Hlthcare of Massachusetts Inc	\$31	\$29	\$38	\$35	\$43	\$46	\$51	\$33
Connecticare of Massachusetts Inc	\$25	\$29	\$33	\$52	\$52	\$52	\$59	\$43
Fallon Community Health Plan Inc	\$15	\$19	\$19	\$24	\$26	\$30	\$32	\$23
Harvard Pilgrim Health Care Inc	\$25	\$25	\$34	\$47	\$49	\$45	\$41	\$37
Health New England Inc	\$27	\$29	\$31	\$33	\$36	\$36	\$38	\$33
Neighborhood Health Plan Inc	\$16	\$19	\$24	\$25	\$27	\$33	\$32	\$27
Tufts Associated HMO Inc	\$22	\$25	\$32	\$39	\$49	\$61	\$54	\$36
United Healthcare of New England Inc	\$32	\$36	\$18	\$20	\$22	\$25	\$22	\$26
Total	\$25	\$29	\$31	\$36	\$40	\$41	\$42	\$35

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	Average Annual
Aetna Health Inc PA Corp	30.5%	0.0%	-2.7%	21.1%	-13.1%	11.7%	6.9%
BCBS of MA	23.3%	-1.4%	49.7%	21.5%	3.7%	-2.9%	14.3%
BCBS of MA HMO Blue Inc	N/A	N/A	N/A	8.8%	6.7%	8.8%	8.1%
BCBS of MA Consolidated	23.3%	-1.4%	8.3%	12.2%	6.1%	5.5%	8.7%
CIGNA Hlthcare of Massachusetts Inc	-6.3%	30.8%	-9.2%	22.8%	8.6%	10.9%	8.7%
Connecticare of Massachusetts Inc	17.1%	12.8%	56.9%	0.5%	-0.9%	13.3%	15.2%
Fallon Community Health Plan Inc	21.6%	1.6%	28.4%	7.1%	15.6%	5.6%	13.0%
Harvard Pilgrim Health Care Inc	2.0%	36.3%	37.2%	3.7%	-8.1%	-9.1%	8.7%
Health New England Inc	6.1%	8.2%	8.5%	6.0%	0.8%	6.8%	6.0%
Neighborhood Health Plan Inc	17.8%	28.5%	1.9%	10.5%	18.7%	-0.6%	12.4%
Tufts Associated HMO Inc	16.3%	28.8%	21.3%	26.0%	23.9%	-11.0%	16.7%
United Healthcare of New England Inc	14.0%	-49.9%	11.6%	9.0%	11.9%	-9.9%	-5.8%
Total	16.9%	9.5%	14.0%	12.6%	2.5%	1.4%	9.3%

Source: Oliver Wyman analysis of Massachusetts carriers' annual statutory financial statements.

Note: Trend rates were calculated from un-rounded pmpm amounts (not shown).

**Table B.2: Loss Ratios for Comprehensive Major Medical Products, 2002-2008**

	2002	2003	2004	2005	2006	2007	2008	Average, 2002 - 2008
Aetna Health Inc PA Corp	79.9%	77.3%	77.1%	81.1%	78.6%	79.0%	80.8%	79.3%
BCBS of MA	85.1%	82.7%	84.7%	81.7%	80.7%	82.2%	86.2%	83.7%
BCBS of MA HMO Blue Inc	N/A	N/A	N/A	88.5%	89.9%	91.0%	90.8%	90.1%
BCBS of MA Consolidated	85.1%	82.7%	84.7%	87.0%	87.9%	89.0%	89.8%	87.0%
CIGNA Hlthcare of Massachusetts Inc	86.6%	91.3%	89.2%	74.3%	84.8%	88.6%	89.4%	87.3%
Connecticare of Massachusetts Inc	86.9%	83.3%	83.5%	74.6%	78.1%	79.7%	74.5%	79.7%
Fallon Community Health Plan Inc	90.0%	89.2%	89.8%	87.3%	90.2%	91.8%	90.9%	90.0%
Harvard Pilgrim Health Care Inc	86.9%	88.3%	86.7%	82.8%	84.4%	86.6%	87.4%	86.1%
Health New England Inc	87.9%	86.5%	86.2%	83.5%	85.2%	87.3%	87.1%	86.2%
Neighborhood Health Plan Inc	90.7%	85.4%	85.1%	90.9%	94.2%	96.0%	86.3%	89.8%
Tufts Associated HMO Inc	89.7%	88.3%	89.8%	85.7%	84.7%	84.4%	87.1%	87.4%
United Healthcare of New England Inc	79.4%	83.9%	74.8%	77.9%	75.1%	79.1%	77.9%	79.5%
Total	86.0%	85.0%	85.3%	85.1%	85.7%	86.8%	87.7%	86.0%

Source: Oliver Wyman analysis of Massachusetts carriers' annual statutory financial statements.



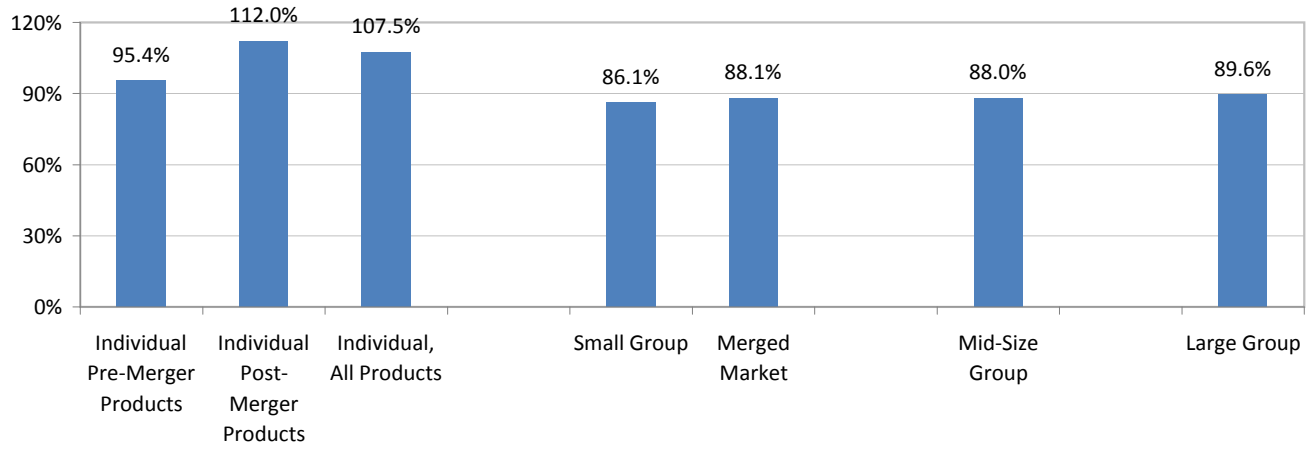
**Table B.3: Premium, Claims, and Loss Ratios in Private Comprehensive Health Insurance Products, 2005-2008**

	2005			2006			2007			2008		
	Premiums (billions)	Claims (billions)	Loss Ratio	Premiums (billions)	Claims (billions)	Loss Ratio	Premiums (billions)	Claims (billions)	Loss Ratio	Premiums (billions)	Claims (billions)	Loss Ratio
Individual Pre-Merger Products	\$0.3	\$0.2	90.2%	\$0.3	\$0.2	95.3%	\$0.2	\$0.2	96.3%	\$0.1	\$0.1	95.4%
Individual Post-Merger Products	na	na	na	na	na	na	\$0.1	\$0.1	105.4%	\$0.2	\$0.3	112.0%
Individual Total	\$0.3	\$0.2	90.2%	\$0.3	\$0.2	95.3%	\$0.3	\$0.3	98.2%	\$0.3	\$0.4	107.5%
Small Group	\$2.5	\$2.1	84.3%	\$2.7	\$2.4	86.7%	\$2.9	\$2.5	86.6%	\$2.9	\$2.5	86.1%
Merged Market Total	na	na	na	na	na	na	\$2.9	\$2.6	86.9%	\$3.2	\$2.8	88.1%
Mid-Size Group	\$2.8	\$2.4	85.1%	\$3.0	\$2.6	86.9%	\$3.1	\$2.7	87.7%	\$3.2	\$2.9	88.0%
Large Group	\$2.3	\$2.0	88.0%	\$2.4	\$2.1	89.1%	\$2.5	\$2.3	90.0%	\$2.4	\$2.2	89.6%
Total	\$7.8	\$6.7	85.9%	\$8.3	\$7.3	87.7%	\$8.8	\$7.8	88.3%	\$8.9	\$7.9	88.6%

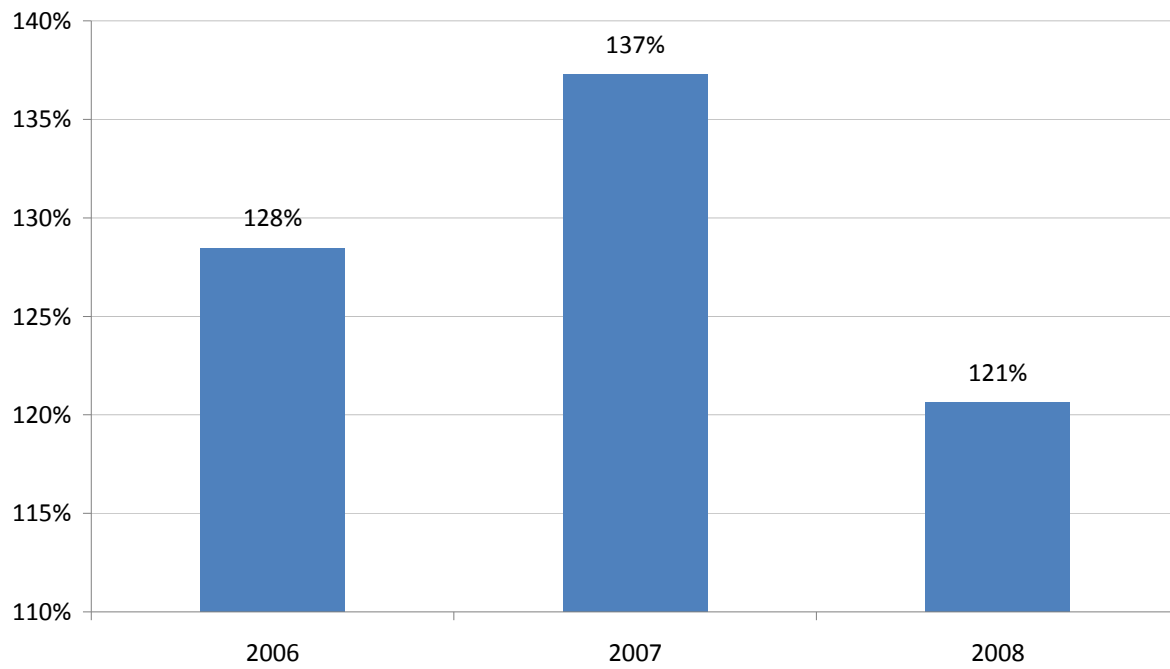
Source: Oliver Wyman analysis of Massachusetts carriers' annual statutory financial statements.

Note: Only carriers included in Chapter 3 are included in this analysis. The total loss ratio calculated for these carriers is slightly higher than for carriers that reported premium and cost information, as reported in Table II.B.2. In addition, differences in the data sources (reporting to the Division versus carriers' financial statements) may produce some differences in the estimates.

**Figure B.1: Loss Ratios by Insurance Market Sector, 2008**



**Figure B.2: Small Group Retention Per Member Per Month as a Percent of Large Group Retention per Member per Month Adjusted for All Rating Factors, 2006-2008**



**Table B.4: Estimated Average Annual Growth in Retention PMPM Adjusted for All Rating Factors by Insurance Market Sector, 2006-2008**

	2006 - 2007	2007 - 2008	Average Annual Growth 2006 - 2008
Small Group	5.5%	-3.9%	1.4%
Mid-Size Group	-0.9%	2.0%	1.2%
Large Group	-1.3%	9.4%	8.0%

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Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

**Table C.1: Most Popular Benefit Plans in Private Comprehensive Health Insurance Products, 2006-2008**

	2007			2008		
	Minimum	Median	Maximum	Minimum	Median	Maximum
Individual Post-Merger						
Actuarial Value	0.578	0.694	0.726	0.635	0.726	0.860
Deductible	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	None
Coinsurance	N/A	N/A	N/A	N/A	N/A	N/A
PCP Office Visit	\$35	\$25	\$25	\$35	\$25	\$25
SPC Office Visit	\$50	\$25	\$25	\$50	\$25	\$25
Inpatient Copay	Deductible	Deductible	\$500	Deductible	\$500	\$800
Outpatient Surgery Copay	Deductible	Deductible	\$250	Deductible	\$250	\$250
Emergency Room Copay	\$200	\$100	\$75	\$200	\$75	\$100
Pharmacy Deductible	n/a	None	None	\$250	None	None
Retail Generic	n/a	\$10	\$10	\$20	\$10	\$15
Retail Preferred	n/a	\$50	\$30	\$50	\$30	\$30
Retail Non-Preferred	n/a	\$100	\$60	\$75	\$60	\$50

	2006			2007			2008		
	Minimum	Median	Maximum	Minimum	Median	Maximum	Minimum	Median	Maximum
Small Group									
Actuarial Value	0.747	0.907	0.970	0.747	0.898	0.970	0.747	0.882	0.954
Deductible	\$1,000	None	None	\$1,000	None	None	\$1,000	None	None
Coinsurance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCP Office Visit	\$20	\$10	\$10	\$20	\$15	\$10	\$20	\$20	\$10
SPC Office Visit	\$20	\$25	\$10	\$20	\$15	\$10	\$20	\$20	\$10
Inpatient Copay	Deductible	\$500	\$0	Deductible	\$350	\$0	Deductible	\$500	\$175
Outpatient Surgery Copay	Deductible	\$250	\$0	Deductible	\$350	\$0	Deductible	\$250	\$50
Emergency Room Copay	\$100	Deductible	\$50	\$100	\$50	\$50	\$100	\$75	\$50
Pharmacy Deductible	\$250	None	None	\$250	None	None	\$250	None	None
Retail Generic	\$10	\$10	\$5	\$10	\$10	\$5	\$10	\$15	\$10
Retail Preferred	\$30	\$25	\$15	\$30	\$25	\$15	\$30	\$30	\$20
Retail Non-Preferred	\$50	\$45	\$35	\$50	\$45	\$35	\$50	\$50	\$35

	2006			2007			2008		
	Minimum	Median	Maximum	Minimum	Median	Maximum	Minimum	Median	Maximum
Mid-Size Group									
Actuarial Value	0.907	0.917	0.970	0.882	0.907	0.970	0.873	0.882	0.917
Deductible	None	None	None	None	None	None	None	None	None
Coinsurance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCP Office Visit	\$10	\$15	\$10	\$20	\$10	\$10	\$20	\$20	\$15
SPC Office Visit	\$25	\$15	\$10	\$20	\$25	\$10	\$20	\$20	\$15
Inpatient Copay	\$500	\$250	\$0	\$500	\$500	\$0	\$500	\$500	\$250
Outpatient Surgery Copay	\$250	\$250	\$0	\$250	\$250	\$0	\$250	\$250	\$250
Emergency Room Copay	not available	\$50	\$50	\$75	Deductible	\$50	\$75	\$75	\$50
Pharmacy Deductible	None	None	None	None	None	None	None	None	None
Retail Generic	\$10	\$10	\$5	\$15	\$10	\$5	\$15	\$15	\$10
Retail Preferred	\$25	\$20	\$15	\$30	\$25	\$15	\$30	\$30	\$20
Retail Non-Preferred	\$45	\$35	\$35	\$50	\$45	\$35	\$50	\$50	\$35

	2006			2007			2008		
	Minimum	Median	Maximum	Minimum	Median	Maximum	Minimum	Median	Maximum
Large Group									
Actuarial Value	0.914	0.944	1.000	0.914	0.928	1.000	0.838	0.915	1.000
Deductible	None	None	None	None	None	None	None	None	None
Coinsurance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCP Office Visit	\$20	\$15	\$0	\$20	\$15	\$0	\$25	\$15	\$0
SPC Office Visit	\$30	\$15	\$0	\$30	\$15	\$0	\$25	\$15	\$0
Inpatient Copay	\$100	\$0	\$0	\$100	\$250	\$0	\$1,000	\$250	\$0
Outpatient Surgery Copay	\$100	\$0	\$0	\$100	\$75	\$0	\$500	\$150	\$0
Emergency Room Copay	\$100	\$50	\$25	\$100	\$75	\$25	\$100	\$75	\$25
Pharmacy Deductible	None	None	None	None	None	None	None	None	None
Retail Generic	\$10	\$10	\$5	\$10	\$5	\$5	\$15	\$10	\$5
Retail Preferred	\$20	\$20	\$15	\$20	\$20	\$15	\$30	\$30	\$15
Retail Non-Preferred	\$35	\$35	\$35	\$35	\$60	\$35	\$50	\$50	\$35

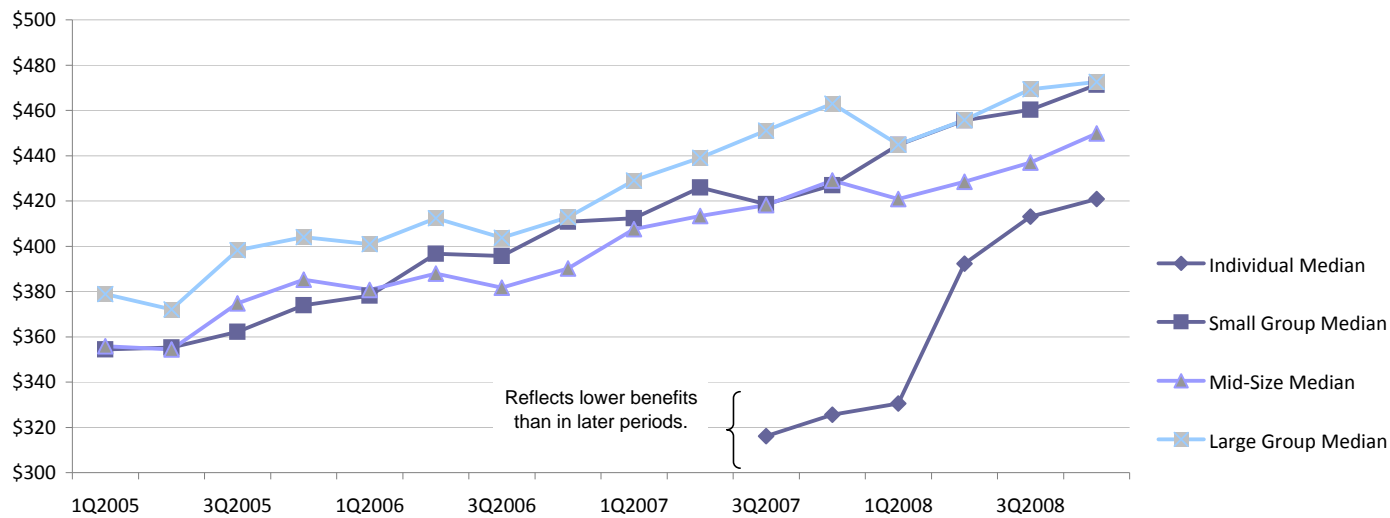
Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

**Table C.2: Percent of Small Group Enrollees by Actuarial Value, 2005 - 2008**

<u>Actuarial Value</u>	<u>2005Q1</u>	<u>2005Q2</u>	<u>2005Q3</u>	<u>2005Q4</u>	<u>2006Q1</u>	<u>2006Q2</u>	<u>2006Q3</u>	<u>2006Q4</u>	<u>2007Q1</u>	<u>2007Q2</u>	<u>2007Q3</u>	<u>2007Q4</u>	<u>2008Q1</u>	<u>2008Q2</u>	<u>2008Q3</u>	<u>2008Q4</u>
0.651 - 0.700	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0.701 - 0.750	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
0.751 - 0.800	6%	6%	6%	5%	5%	5%	4%	5%	5%	5%	4%	4%	4%	5%	6%	10%
0.801 - 0.850	10%	9%	9%	10%	10%	9%	10%	10%	10%	11%	11%	12%	13%	15%	17%	16%
0.851 - 0.900	14%	21%	22%	25%	28%	31%	35%	38%	41%	42%	46%	48%	53%	49%	47%	47%
0.901 - 0.950	46%	45%	44%	42%	44%	42%	40%	37%	36%	34%	31%	30%	27%	27%	26%	25%
0.951 - 1.000	22%	18%	17%	17%	12%	11%	10%	9%	8%	7%	6%	6%	4%	3%	3%	2%
Weighted Actuarial Value	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.89	0.89	0.89	0.89	0.89	0.88	0.88	0.87	0.87

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Figure C.1: Median Premiums Per Member Per Month for Single Coverage for the Most Popular Products by Insurance Market Sector 2005-2008



**Table C.3: Percent of Enrollment in Most Popular Private Comprehensive Health Insurance Plan, 2005-2008**

	1Q2005	3Q2005	1Q2006	3Q2006	1Q2007	3Q2007	1Q2008	3Q2008
Individual Post-Merger	n/a	n/a	n/a	n/a	n/a	18.0%	18.2%	17.1%
Small Group	30.2%	28.9%	25.9%	21.9%	23.8%	23.1%	20.6%	17.2%
Mid-Size Group	11.0%	10.7%	8.5%	8.7%	9.8%	9.9%	9.1%	7.0%
Large Group	11.7%	11.6%	11.6%	11.5%	12.0%	11.6%	12.1%	12.7%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Note: Large groups may have a higher percentage of enrollment in the most popular plan than mid-size groups due to a relatively small number of very large employers.



**Table C.4: Lowest-Cost Private Comprehensive Health Insurance Products - All Sectors, 2006-2008<sup>a</sup>**

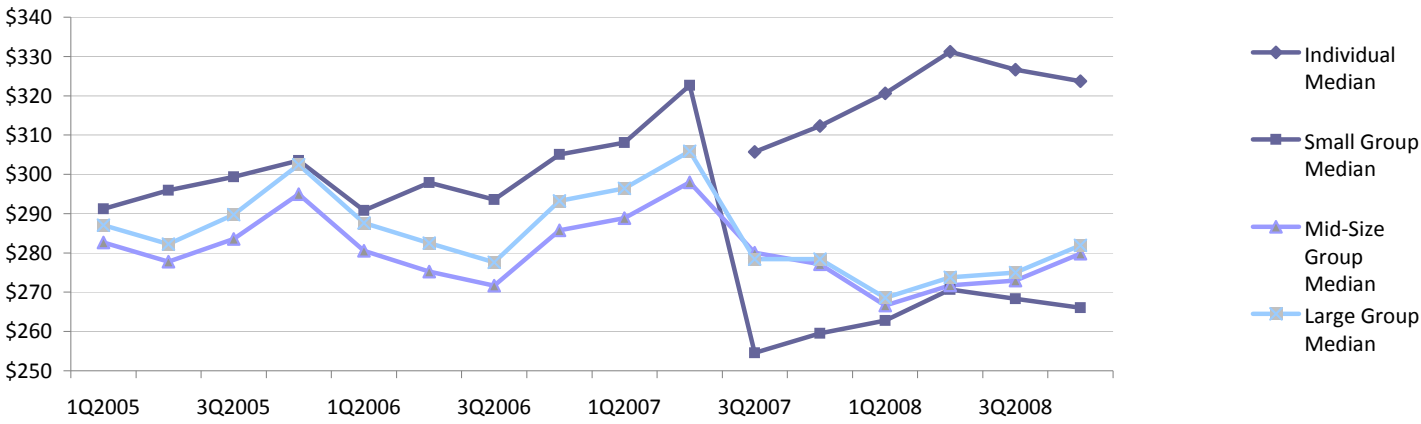
	2006			2007			2008		
	Minimum Product	Median Product	Maximum Product	Minimum Product	Median Product	Maximum Product	Minimum Product	Median Product	Maximum Product
Actuarial Value	0.474	0.702	0.860	0.474	0.702	0.860	0.474	0.646	0.726
Deductible	\$3,000	\$2,000	\$0	\$3,000	\$2,000	\$0	\$3,000	\$2,000	\$2,000
Coinsurance	80%	N/A	N/A	80%	N/A	N/A	80%	80%	N/A
PCP Office Visit	\$20	\$20	\$25	\$20	\$20	\$25	\$20	\$25	\$25
SPC Office Visit	\$20	\$20	\$25	\$20	\$20	\$25	\$20	\$25	\$25
Inpatient Copay	Ded / Coins	Deductible	\$800	Ded / Coins	Deductible	\$800	Ded / Coins	Ded / Coins	Deductible
Outpatient Surgery Copay	Ded / Coins	Deductible	\$250	Ded / Coins	Deductible	\$250	Ded / Coins	Ded / Coins	Deductible
Emergency Room Copay	Ded / Coins	\$75	\$100	Ded / Coins	\$75	\$100	Ded / Coins	\$100	\$75
Pharmacy Deductible	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$100	\$0
Retail Generic	\$10	\$10	\$15	\$10	\$10	\$15	\$10	\$15	\$15
Retail Preferred	\$25	\$25	\$30	\$25	\$25	\$30	\$25	50%	\$30
Retail Non-Preferred	\$40	\$50	\$50	\$40	\$50	\$50	\$40	50%	\$50

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

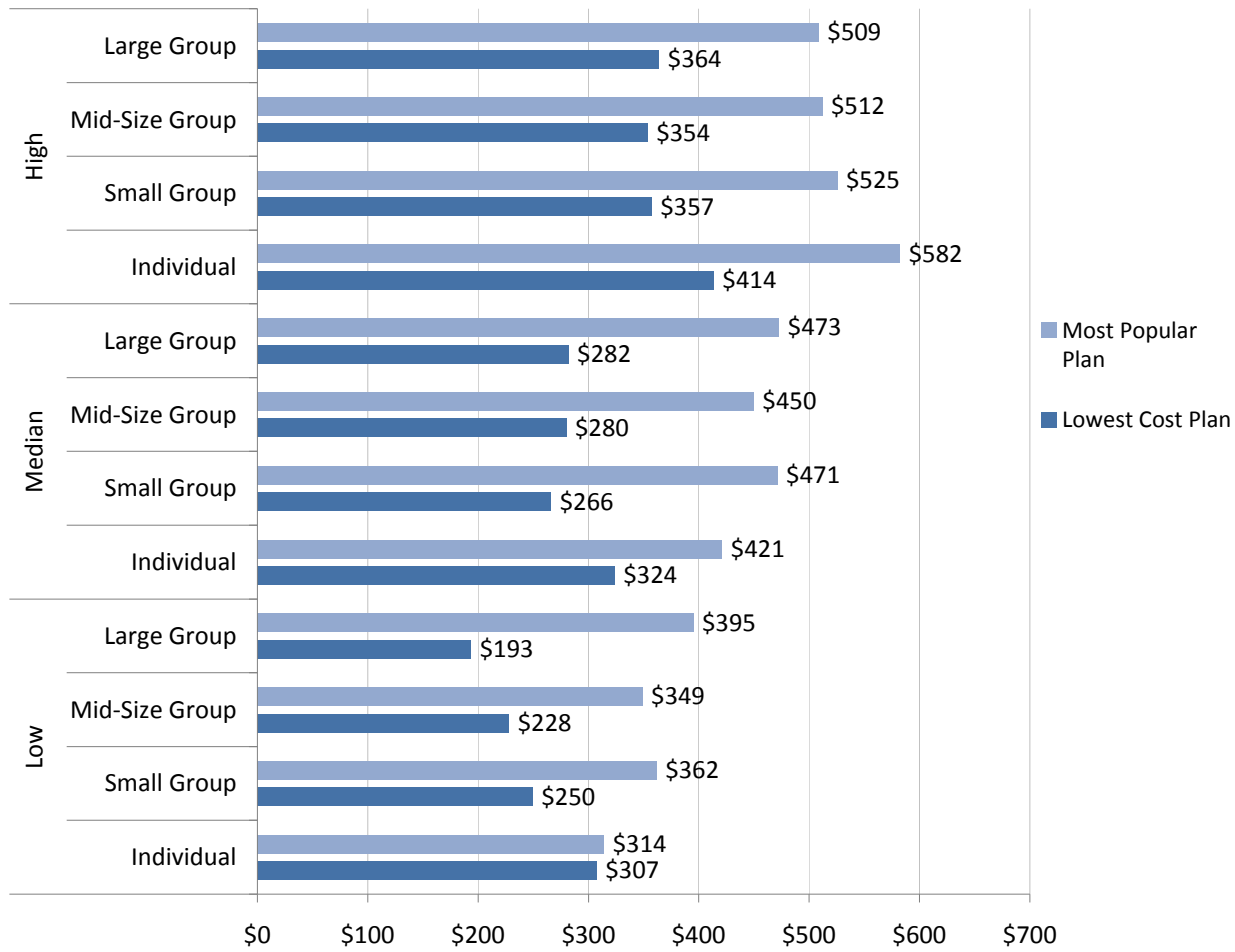
Notes: The actuarial value represents the premium charged for a given plan relative to the richest plan that was included in the analysis, a plan with very little member cost sharing. The richest plan has an actuarial value of 1.0. The benefits that appear in the table are the benefits associated with the plan with the actuarial value shown.

<sup>a</sup> The minimum, median, and maximum benefit plan are the same for all insured market sectors, excluding individuals pre-merger (not shown).

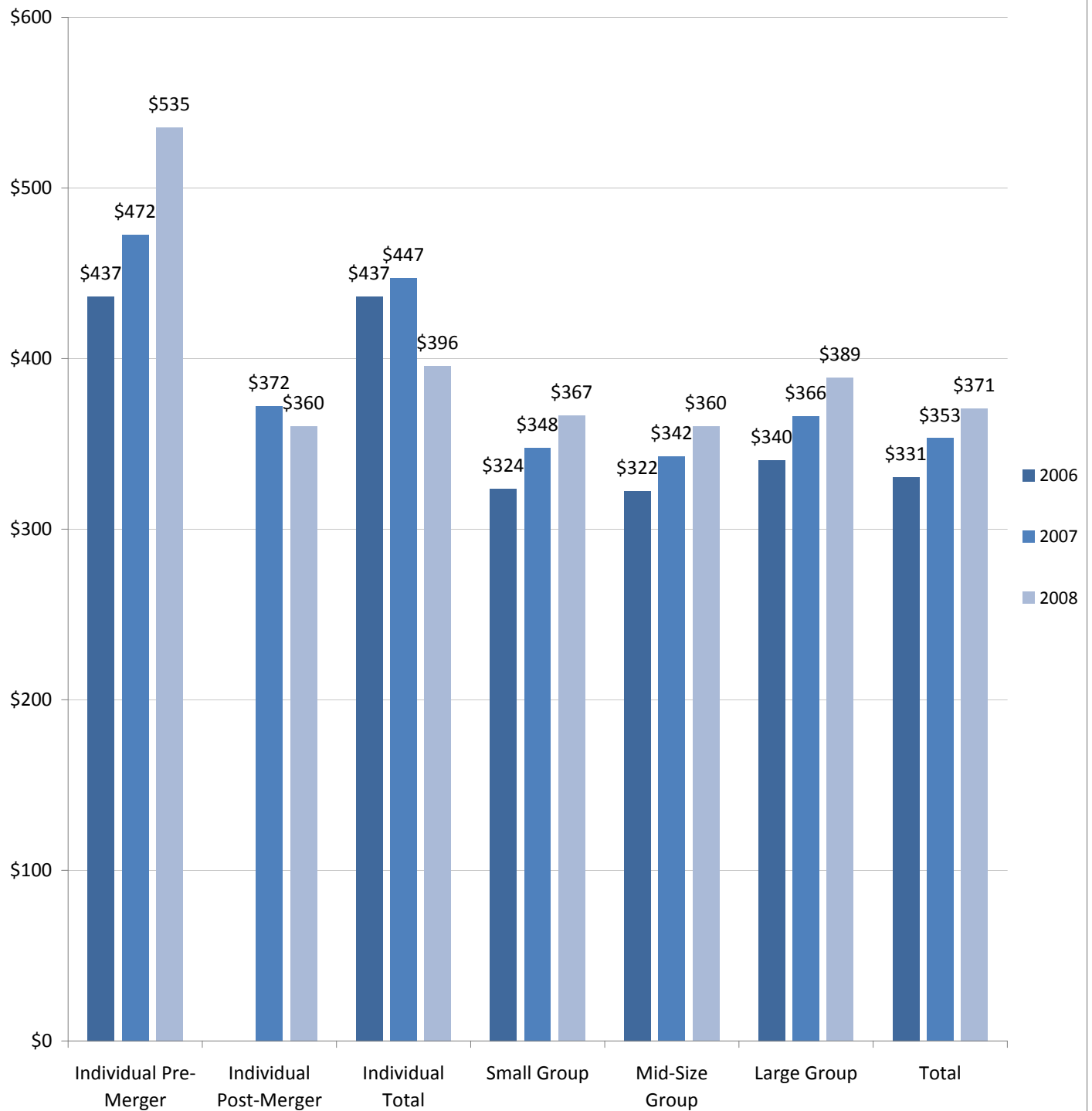
Figure C.2: Median Premiums for the Lowest-Cost Single Coverage by Insurance Market Sector, 2005-2008



**Figure C.3: Single Premiums for the Lowest Cost Plan and Most Popular Plan: 4Q2008**



**Figure C.4: Unadjusted Premiums per Member per Month by Insurance Market Sector, 2006-2008**



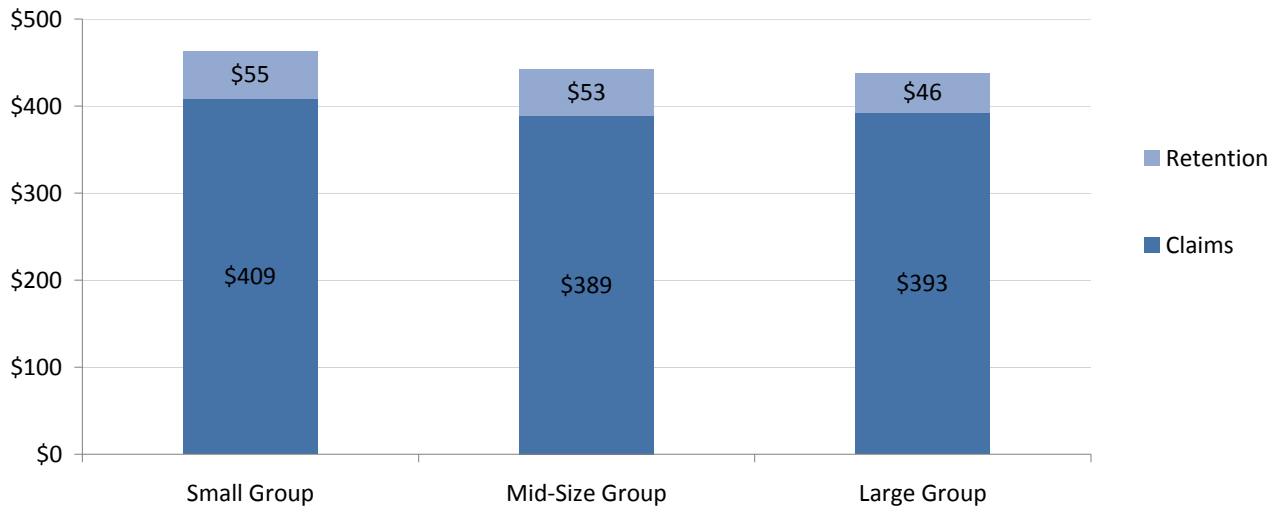
**Table C.5: Unadjusted and Adjusted Premiums PMPM, and Percent Change in Premiums for Private Comprehensive Health Insurance Products, 2006-**

	Unadjusted Premium PMPM				
	Premium PMPM			Percent Change	
	2006	2007	2008	2006-2007	2007-2008
Small Group	\$324	\$348	\$367	7.4%	5.4%
Mid-Size Group	\$322	\$342	\$360	6.3%	5.2%
Large Group	\$340	\$366	\$389	7.6%	6.1%
<i>Adjusted for: Age and Gender</i>					
	Premium PMPM			Percent Change	
	2006	2007	2008	2006-2007	2007-2008
Small Group	\$339	\$363	\$380	7.1%	4.7%
Mid-Size Group	\$340	\$361	\$378	5.9%	4.7%
Large Group	\$343	\$368	\$390	7.4%	5.8%
<i>Adjusted for: Geographic Area</i>					
	Premium PMPM			Percent Change	
	2006	2007	2008	2006-2007	2007-2008
Small Group	\$334	\$358	\$377	7.2%	5.2%
Mid-Size Group	\$328	\$349	\$366	6.2%	5.1%
Large Group	\$342	\$369	\$392	7.9%	6.1%
<i>Adjusted for: Benefits</i>					
	Premium PMPM			Percent Change	
	2006	2007	2008	2006-2007	2007-2008
Small Group	\$376	\$407	\$435	8.3%	6.9%
Mid-Size Group	\$370	\$394	\$414	6.4%	5.3%
Large Group	\$381	\$409	\$433	7.4%	5.9%
<i>Adjusted for All Factors</i>					
	Premium PMPM			Percent Change	
	2006	2007	2008	2006-2007	2007-2008
Small Group	\$406	\$438	\$464	7.8%	5.8%
Mid-Size Group	\$398	\$422	\$442	5.9%	4.8%
Large Group	\$387	\$416	\$438	7.5%	5.4%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Notes: Only carriers included in Chapter 3 were included in this analysis. Trend rates were calculated from un-rounded pmpm amounts (not shown).

**Figure C.5: Decomposition of Premium PMPM Adjusted for All Rating Factors, 2008**



**Table C.6: Median Monthly Premium Scenarios, Third Quarter 2008**

	Median Premiums		Percent Change from Baseline		Renewal Rate Increase <sup>a</sup>	
	Individual	Family	Individual	Family	Individual	Family
Baseline Scenario: Six employees	\$470	\$1,250	N/A	N/A	6.0%	6.0%
Scenario 1: No change in employees; two employees age into next five-year age band	\$488	\$1,299	3.9%	3.9%	10.2%	10.2%
Scenario 2: One employee of roughly average age leaves the group	\$513	\$1,367	9.2%	9.3%	15.8%	15.9%
Scenario 3: One employee of roughly average age leaves the group; one employee ages into next five-year age band	\$521	\$1,389	11.0%	11.1%	17.6%	17.7%
Scenario 4: One employee retires; a 40-year old replacement is hired	\$420	\$1,118	-10.6%	-10.6%	-5.3%	-5.3%
	Median Premiums		Percent Change from Baseline		Renewal Rate Increase <sup>a</sup>	
	Individual	Family	Individual	Family	Individual	Family
Baseline Scenario: Twenty employees	\$463	\$1,239	N/A	N/A	6.0%	6.0%
Scenario 1: No change in employees; six employees age into next five-year age band	\$484	\$1,295	4.5%	4.5%	10.7%	10.7%
Scenario 2: Three employees of roughly average age leave the group	\$464	\$1,240	0.1%	0.1%	6.1%	6.1%
Scenario 3: Three employees of roughly average age leave the group; three employees age into next five-year age band	\$477	\$1,277	3.0%	3.0%	9.2%	9.2%
Scenario 4: One employee retires; a 40-year old replacement is hired	\$444	\$1,186	-4.3%	-4.3%	1.5%	1.5%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Note: Trend rates were calculated from un-rounded pmpm amounts (not shown).

<sup>a</sup> Renewal rate increase assumes a 6% increase prior to changes in demographics.

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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.2c**

### **Premium Levels and Trends in Private Health Insurance Plans: Additional Tables and Figures**

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## **Premium Levels and Trends in Private Health Insurance Plans: Additional Tables and Figures**

Prepared by Dianna Welch, FSA, MAAA,  
Oliver Wyman Actuarial Consulting, Inc.

February 2010



Deval L. Patrick, Governor  
Commonwealth of Massachusetts  
Timothy P. Murray  
Lieutenant Governor

JudyAnn Bigby, Secretary  
Executive Office of Health and Human Services  
David Morales, Commissioner  
Division of Health Care Finance and Policy

**Table 1: Percent Change in Member Months and Average Group Size in Private Comprehensive Health Insurance Products, 2006-2008**

	2006 to 2007		2007 to 2008	
	Percent Change in Member Months	Percent Change in Average Group Size	Percent Change in Member Months	Percent Change in Average Size
Individual	-0.4%	n/a	42.8%	n/a
Small Group	-1.5%	-4.4%	-4.3%	-7.4%
Mid-Size Group	-1.3%	0.1%	-0.7%	-0.5%
Large Group	-1.0%	1.2%	-8.8%	-4.7%
Self Insured	5.6%	12.4%	1.9%	-1.2%
Total	1.8%		-0.8%	

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Note: Average group size is based on the number of enrolled subscribers (employees) per employer group, and not the

**Table 2: Average Age and Percent Change in Average Age in Private Comprehensive Health Insurance Products, 2005-2008**

	Average Age				Percentage Change in Average Age			Total Change 2005-2008
	2005	2006	2007	2008	2006	2007	2008	
<b>Individual</b>	<b>36.9</b>	<b>36.8</b>	<b>37.3</b>	<b>37.1</b>	<b>-0.5%</b>	<b>1.4%</b>	<b>-0.5%</b>	<b>0.4%</b>
Small Group	33.1	33.3	33.5	33.7	0.8%	0.6%	0.7%	2.0%
Mid-Size Group	32.6	33.0	33.1	33.2	1.0%	0.4%	0.2%	1.7%
Large Group	33.3	33.4	33.7	33.7	0.4%	0.7%	0.1%	1.1%
Total	33.2	33.4	33.6	33.8	0.7%	0.6%	0.5%	1.8%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

**Table 3: Average Number of Members per Contract in Private Comprehensive Health Insurance Products, 2005-2008**

	2005	2006	2007	2008
Individual Pre-Merger	1.58	1.59	1.61	1.64
Individual Post-Merger	na	na	1.36	1.41
Individual	1.58	1.59	1.54	1.45
Small Group	2.05	2.04	2.06	2.06
Mid-Size Group	2.14	2.12	2.12	2.12
Large Group	2.19	2.19	2.20	2.18

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Notes: "Members per contract" measures the average size of families covered by products in each sector. Individual Pre-Merger products are a closed block of products that may continue to be renewed by existing policyholders.

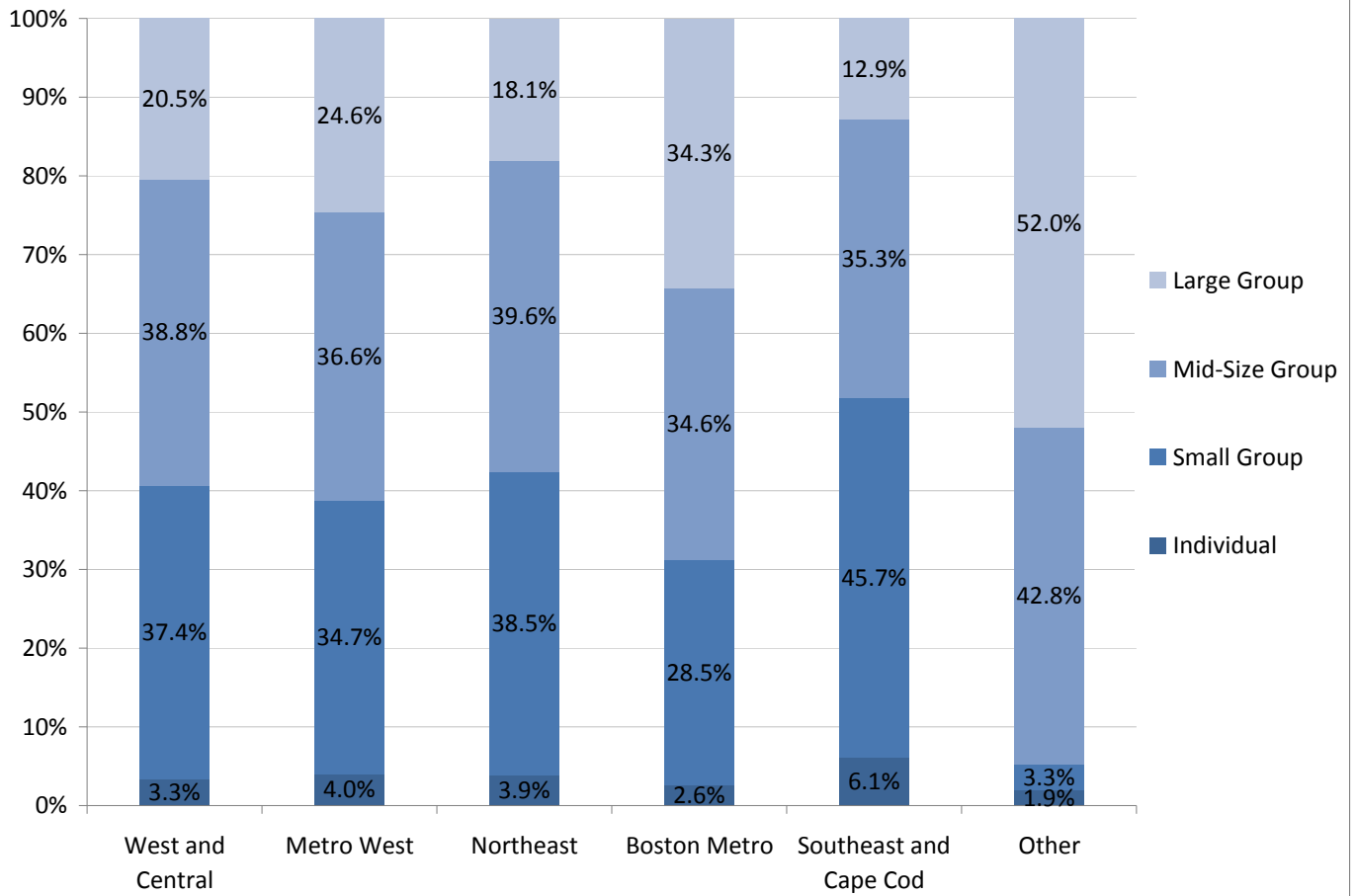
**Table 4: Percent Distribution of Enrollment in Private Comprehensive Health Insurance Products by Region, 2008**

Region	Zip Codes	Individual	Small Group	Mid-Size Group	Large Group
West	010-013	8.0%	9.7%	8.8%	9.1%
Central	014-016	10.4%	11.9%	11.9%	6.5%
Metro West	017, 020	15.7%	14.0%	13.6%	13.0%
Northeast	018-019	18.0%	18.3%	17.4%	11.4%
Boston Metro	021-022, 024	27.4%	31.0%	34.6%	49.0%
Southeast	023, 027	11.6%	10.5%	8.9%	3.8%
Cape Cod & Islands	025-026	7.5%	4.3%	1.6%	1.7%
Other		1.5%	0.3%	3.1%	5.5%
Total		100.0%	100.0%	100.0%	100.0%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Notes: Enrollment is measured as member months. The zip code for groups is based on the zip code of the employer and not the member.

**Figure 1: Regional Enrollment by Sector, 2008**





**Table 5: Administrative Expense Ratios for Massachusetts Comprehensive Major Medical Products by Insurance Company, 2002-2008**

	2002	2003	2004	2005	2006	2007	2008	2002 - 2008
Aetna Health Inc PA Corp.	14.8%	17.5%	16.4%	14.4%	16.0%	12.4%	13.1%	14.6%
BCBS of MA	11.2%	12.2%	11.1%	14.0%	15.9%	15.5%	14.7%	12.6%
BCBS of MA HMO Blue Inc.	N/A	N/A	N/A	10.3%	10.4%	10.3%	10.6%	10.4%
BCBS of MA Consolidated	11.2%	12.2%	11.1%	11.2%	11.6%	11.5%	11.5%	11.5%
CIGNA Healthcare of MA Inc.	13.6%	11.3%	11.5%	8.7%	13.2%	12.9%	12.4%	12.2%
Connecticare of MA Inc.	12.7%	12.8%	12.9%	18.9%	18.1%	17.5%	18.6%	16.0%
Fallon Community Health Plan Inc.	8.9%	9.3%	7.5%	8.5%	8.3%	8.9%	8.9%	8.6%
Harvard Pilgrim Health Care Inc.	10.9%	10.0%	12.1%	14.9%	14.2%	12.2%	10.5%	12.2%
Health New England Inc.	12.9%	12.1%	11.7%	11.8%	11.7%	11.1%	11.2%	11.7%
Neighborhood Health Plan Inc.	7.8%	8.1%	9.1%	8.6%	8.6%	9.1%	8.5%	8.6%
Tufts Associated HMO Inc.	10.1%	10.3%	11.4%	12.4%	14.7%	17.2%	14.7%	12.6%
United Healthcare of New England Inc.	14.4%	15.4%	20.1%	17.7%	17.8%	19.1%	16.6%	16.5%
Total	11.4%	11.8%	11.9%	12.4%	12.9%	12.3%	11.8%	12.1%

Source: Oliver Wyman analysis of Massachusetts carriers' annual statutory financial statements.

**Table 6: Decomposition of Retention Components Used in Pricing Private Comprehensive Health Insurance Products, 2007 and 2009**

	2Q2007			2Q2009			Estimated Annual Trend		
	Low retention	Average retention <sup>a</sup>	High retention	Low retention	Average retention <sup>a</sup>	High retention	Low retention	Average retention <sup>a</sup>	High retention
Retention %							Percentage point change in retention		
Individual	-11.3%	5.7%	11.6%	11.0%	11.9%	24.0%	22.3%	6.2%	12.4%
Small	11.0%	15.9%	24.0%	11.0%	12.4%	24.0%	0.0%	-3.5%	0.0%
Mid-Size	11.0%	12.3%	17.7%	10.7%	11.3%	17.7%	-0.3%	-1.0%	0.0%
Large	8.3%	10.0%	17.7%	8.3%	9.6%	17.7%	0.0%	-0.3%	0.0%
Contribution to Surplus/Profit as Percent of Total Premium							Percentage point change in surplus/profit		
Individual	-19.1%	2.3%	3.7%	1.0%	3.0%	6.5%	20.1%	0.6%	2.8%
Small	1.0%	3.8%	6.5%	1.0%	2.8%	6.5%	0.0%	-1.0%	0.0%
Mid-Size	2.0%	3.6%	8.7%	2.0%	2.8%	8.7%	0.0%	-0.9%	0.0%
Large	2.0%	2.7%	8.7%	2.0%	2.2%	8.7%	0.0%	-0.4%	0.0%
Contribution to Surplus/Profit as Percent of Total Retention							Percentage point change in surplus/profit		
Individual	18.2%	48.9%	59.7%	5.4%	25.0%	26.9%	-12.7%	-24.0%	-32.8%
Small	5.4%	23.6%	26.9%	5.4%	22.8%	26.9%	0.0%	-0.8%	0.0%
Mid-Size	15.8%	29.6%	49.2%	16.8%	24.3%	49.2%	1.1%	-5.3%	0.0%
Large	16.0%	27.6%	49.2%	16.8%	23.5%	49.2%	0.8%	-4.1%	0.0%
Commissions as Percent of Total Premium							Percentage point change in commissions		
Individual	0.0%	0.2%	1.5%	1.6%	1.8%	6.5%	1.6%	1.7%	5.0%
Small	1.0%	1.8%	6.5%	1.6%	2.1%	6.5%	0.6%	0.3%	0.0%
Mid-Size	1.2%	1.5%	4.0%	2.0%	2.4%	4.0%	0.8%	0.9%	0.0%
Large	0.7%	1.2%	3.5%	0.4%	1.2%	4.0%	-0.3%	0.0%	0.5%
Commissions as Percent of Total Retention							Percentage point change in commissions		
Individual	0.0%	1.4%	13.6%	13.4%	15.3%	29.2%	13.4%	13.9%	15.5%
Small	8.0%	11.1%	31.8%	13.4%	16.6%	29.2%	5.4%	5.6%	-2.7%
Mid-Size	10.0%	12.0%	31.8%	16.9%	21.6%	29.2%	6.9%	9.5%	-2.7%
Large	8.0%	10.8%	22.5%	4.8%	10.5%	24.6%	-3.2%	-0.3%	2.1%
General Administrative Expense as Percent of Total Premium							Percentage point change in general administrative expense		
Individual	2.5%	3.2%	9.1%	6.0%	7.1%	12.9%	3.5%	3.9%	3.8%
Small	5.0%	10.3%	12.9%	6.0%	7.5%	12.9%	1.0%	-2.8%	0.0%
Mid-Size	5.0%	7.1%	10.3%	5.6%	6.1%	10.3%	0.6%	-1.0%	0.0%
Large	4.8%	6.1%	9.6%	4.3%	6.2%	9.3%	-0.5%	0.1%	-0.3%
General Administrative Expense as Percent of Total Retention							Percentage point change in general administrative expense		
Individual	40.3%	39.7%	78.5%	46.0%	59.7%	70.1%	5.7%	20.0%	-8.3%
Small	45.5%	65.3%	70.1%	46.0%	60.5%	70.1%	0.6%	-4.8%	0.0%
Mid-Size	33.9%	58.4%	68.2%	33.9%	54.1%	63.6%	0.0%	-4.3%	-4.5%
Large	33.9%	61.6%	66.4%	33.9%	66.0%	70.2%	0.0%	4.4%	3.8%

Source: Oliver Wyman analysis of rating data for insurance carriers in Massachusetts.

Notes: Retention is defined as the portion of premium maintained by the carriers to pay for administrative expenses and contribution to surplus or profit. Retention is equal to 1 minus the loss ratio. While the sum of contribution to surplus or profit, commissions, and general administrative expense is equal to the total retention for a given carrier, the low and high amounts shown are calculated separately for each component across the carriers and, therefore, do not sum to the total. 2Q07 individual products are pre-merger; 2Q2009 individual products include post-merger products only. Post-merger individual and small group values were reported as identical due to the nature of the markets being merged, and not as a reflection of the true cost to administer an individual versus a small group.

<sup>a</sup> The average shown is an average of carriers that were able to provide expense components by sector, weighted by membership. The average does not include all carriers with significant market share.

**Table 7: Single and Family Premiums for the Most Popular Private Comprehensive Health Insurance Products, 2005-2008**

	1Q2005	3Q2005	1Q2006	3Q2006	1Q2007	3Q2007	1Q2008	3Q2008
<b>Single premium</b>								
Individual Post-Merger								
Low	na	na	na	na	na	\$266	\$283	\$310
Median	na	na	na	na	na	\$316	\$331	\$413
High	na	na	na	na	na	\$558	\$589	\$626
Small Group								
Low	\$297	\$313	\$316	\$328	\$351	\$350	\$373	\$356
Median	\$354	\$362	\$378	\$396	\$412	\$419	\$445	\$460
High	\$388	\$405	\$439	\$460	\$484	\$456	\$482	\$515
Mid-Size Group								
Low	\$278	\$293	\$296	\$307	\$329	\$338	\$338	\$344
Median	\$356	\$375	\$381	\$382	\$408	\$418	\$421	\$437
High	\$410	\$435	\$447	\$450	\$480	\$521	\$470	\$509
Large Group								
Low	\$297	\$313	\$320	\$328	\$351	\$360	\$383	\$390
Median	\$379	\$398	\$401	\$404	\$429	\$451	\$445	\$469
High	\$420	\$445	\$457	\$463	\$494	\$537	\$497	\$525
<b>Family Premium</b>								
Individual Pre-Merger								
Low	n/a	n/a	n/a	n/a	n/a	\$705	\$749	\$809
Median	n/a	n/a	n/a	n/a	n/a	\$814	\$858	\$1,084
High	n/a	n/a	n/a	n/a	n/a	\$1,485	\$1,567	\$1,666
Small Group								
Low	\$926	\$947	\$976	\$962	\$1,073	\$1,083	\$1,156	\$1,080
Median	\$968	\$978	\$1,030	\$1,082	\$1,143	\$1,146	\$1,181	\$1,249
High	\$1,017	\$1,073	\$1,117	\$1,171	\$1,231	\$1,227	\$1,305	\$1,362
Mid-Size Group								
Low	\$745	\$786	\$795	\$824	\$883	\$906	\$906	\$922
Median	\$931	\$981	\$1,014	\$1,021	\$1,090	\$1,118	\$1,118	\$1,161
High	\$1,104	\$1,171	\$1,201	\$1,205	\$1,241	\$1,327	\$1,231	\$1,318
Large Group								
Low	\$795	\$840	\$859	\$879	\$942	\$967	\$1,028	\$1,045
Median	\$979	\$1,029	\$1,070	\$1,074	\$1,131	\$1,192	\$1,188	\$1,253
High	\$1,129	\$1,198	\$1,229	\$1,233	\$1,270	\$1,367	\$1,303	\$1,336

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

**Table 8: Single and Family Premiums for the Lowest-Cost Private Comprehensive Health Insurance Products, 2005-2008**

	1Q2005	3Q2005	1Q2006	3Q2006	1Q2007	3Q2007	1Q2008	3Q2008
<b>Single premium</b>								
Individual Post-Merger								
Low	na	na	na	na	na	\$279	\$297	\$302
Median	na	na	na	na	na	\$306	\$321	\$327
High	na	na	na	na	na	\$407	\$348	\$405
Small Group								
Low	\$248	\$260	\$221	\$233	\$225	\$225	\$240	\$246
Median	\$291	\$299	\$291	\$294	\$308	\$255	\$263	\$268
High	\$361	\$343	\$341	\$357	\$374	\$316	\$302	\$350
Mid-Size Group								
Low	\$234	\$246	\$210	\$220	\$213	\$219	\$232	\$240
Median	\$283	\$284	\$281	\$272	\$289	\$280	\$267	\$273
High	\$377	\$354	\$324	\$320	\$345	\$296	\$305	\$347
Large Group								
Low	\$240	\$252	\$214	\$225	\$218	\$224	\$209	\$211
Median	\$287	\$290	\$288	\$278	\$296	\$278	\$269	\$275
High	\$374	\$351	\$322	\$324	\$342	\$305	\$314	\$357
<b>Family Premium</b>								
Individual Pre-Merger								
Low	n/a	n/a	n/a	n/a	n/a	\$727.83	\$774.78	\$796.23
Median	n/a	n/a	n/a	n/a	n/a	\$819.20	\$851.20	\$867.41
High	n/a	n/a	n/a	n/a	n/a	\$1,068.71	\$885.14	\$1,032.27
Small Group								
Low	\$737.68	\$694.91	\$662.64	\$653.64	\$746.99	\$667.05	\$684.09	\$687.80
Median	\$800.72	\$817.60	\$793.12	\$816.33	\$821.82	\$719.45	\$707.51	\$726.14
High	\$957.51	\$910.03	\$898.00	\$935.98	\$981.05	\$827.84	\$839.37	\$891.73
Mid-Size Group								
Low	\$628.89	\$660.55	\$561.93	\$591.27	\$572.11	\$587.30	\$607.49	\$632.96
Median	\$734.87	\$752.60	\$750.50	\$732.12	\$760.80	\$745.27	\$711.84	\$728.79
High	\$998.87	\$938.69	\$859.21	\$839.17	\$914.37	\$794.40	\$776.36	\$882.24
Large Group								
Low	\$642.71	\$675.06	\$574.28	\$604.27	\$584.69	\$600.21	\$548.63	\$553.78
Median	\$744.24	\$771.83	\$766.88	\$748.15	\$777.46	\$741.15	\$717.30	\$734.45
High	\$991.15	\$931.43	\$852.56	\$848.71	\$907.30	\$812.42	\$799.51	\$908.54

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

**Table 9: Member Months, Unadjusted Premiums<sup>a</sup>, 2006-2008**

	2006			2007			2008					
	Member Months (000s)	Total Premium (millions)	Premium per Member per Month	Member Months (000s)	Total Premium (millions)	Premium per Member per Month	Member Months (000s)	Total Premium (millions)	Premium per Member per Month	2007	2008	Average Annual Growth, 2006-2008
Individual Pre-Merger	599.0	\$261.5	\$437	446.2	\$210.8	\$472	170.8	\$91.5	\$535	8.2%	13.3%	10.8%
Individual Post-Merger	na	na	n/a	150.2	\$55.9	\$372	679.8	\$245.0	\$360	n/a	-3.2%	n/a
Individual Total	599.0	\$261.5	\$437	596.5	\$266.8	\$447	850.6	\$336.5	\$396	2.5%	-11.5%	-4.8%
Small Group	8,432.5	\$2,730.4	\$324	8,314.7	\$2,891.2	\$348	7,971.3	\$2,921.8	\$367	7.4%	5.4%	6.4%
Mid-Size Group	9,222.4	\$2,972.1	\$322	9,091.9	\$3,113.5	\$342	9,022.0	\$3,248.8	\$360	6.3%	5.2%	5.7%
Large Group	6,995.4	\$2,381.3	\$340	6,876.5	\$2,518.8	\$366	6,234.3	\$2,423.1	\$389	7.6%	6.1%	6.9%
Total	25,249.4	\$8,345.3	\$331	24,879.6	\$8,790.2	\$353	24,078.2	\$8,930.2	\$371	6.9%	5.0%	5.9%

Source: Oliver Wyman analysis of data from Massachusetts carriers for resident and non-resident insured lives.

Notes: Only carriers included in Chapter 3 are included in this analysis. Individual Pre-Merger products are a closed block of products that may continue to be renewed by existing policyholders. Trend rates

<sup>a</sup> Premiums are unadjusted for differences in demographics and benefits.

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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.3a**

### **Part III: Health Spending Trends for Privately Insured 2006-2008**

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# **Massachusetts Health Care Cost Trends**

## **Part III: Health Spending Trends for Privately Insured**

### **2006-2008**

**February 2010**

**Deval L. Patrick, Governor**  
Commonwealth of Massachusetts

**Timothy P. Murray**  
Lieutenant Governor



**JudyAnn Bigby, Secretary**  
Executive Office of Health and Human Services

**David Morales, Commissioner**  
Division of Health Care Finance and Policy

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# Introduction – Scope and Data

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## About this Chart Book

This series of charts and tables supplements the Executive Summary and detailed Technical Report entitled *Massachusetts Health Care Cost Trends, Privately Insured Medical Claims Expenditures, 2006-2008*. This combined set of publications is the third in a series of reports to be issued by the Massachusetts Division of Health Care Finance and Policy (DHCFP) as part of its new responsibilities under Chapter 305 of the Acts of 2008. The information covered in these reports was developed with the strategic input of staff from Brandeis University's Heller School for Social Policy and Management, and with analyses conducted by Mathematica Policy Research, Inc. and Oliver Wyman Actuarial Consulting, Inc.

This *Chart Book* and its accompanying Executive Summary and Technical Report seek to document the major trends in private health insurance expenditures covered by both comprehensive fully-insured and self-insured health plans in Massachusetts from 2006 through 2008. Those seeking a summary and synthesis of key points should review the Executive Summary. This chart book along with the Technical Report provide more detailed information on specific service areas. This chart book contains a summary of findings and a detailed listing of findings preceding each section.

See [www.mass.gov/dhcfp/costtrends](http://www.mass.gov/dhcfp/costtrends) for the companion Executive Summary and full Technical Report and related reports on premium trends and MA health market context.

## The Data

Estimates of spending are derived from claims data for Massachusetts residents with commercial coverage (fully-insured and self-insured, group and non-group), as reported by the six largest health insurers in the Commonwealth. Spending under public coverage plans such as Medicare, Medicaid, and CommCare are not included in this study.

Although the health insurers represented account for approximately 90% of privately-insured lives, claim and enrollment information was submitted on approximately 3/4 of their enrollees (data on members enrolled in affiliated plans was not provided). Total expenditures in this report, therefore, represent about 2/3 of privately insured lives and just under one-half of all covered lives (including publicly insured).

As reported here, spending includes the amounts paid by health insurers and self-insured employers to health care providers, as well as patient out-of-pocket expenses for covered services (e.g. co-payments and deductibles). Therefore, these trends include the full cost of health care services even as more of these costs are shifted to consumers with benefit buy down. Member cost-sharing represents, on average, 8% of health care expenditures.

Health insurers also reported payments to providers that did not flow through their claims systems—including capitation payments, withholds, and pay-for-performance bonuses; these amounts are included in total expenditure measures but not in analysis by service category.

Spending estimates were adjusted actuarially to account for claims that were incurred but not yet reported, as well as for about 25% of membership whose prescription drug spending was “carved out” of comprehensive benefits and therefore not reported.

Cost and enrollment are reported in total and by “health plan member”. In this report, health plan members are estimated as average monthly enrollment over a twelve month calendar year, not as unique health plan members during the year.



# Summary of Key Findings

**Overall Trends in Health Care Expenditures:** Expenditures per health plan member grew 7.5% per year between 2006 and 2008. From 2006 to 2008, payments for hospital outpatient services grew fastest at 12% and 14% per year. Hospital outpatient payments together with payments to physicians and other professionals accounted for most of the growth in total spending over the period due to a combination of significant per member expenditure growth and their large share of overall health care expenditures. Compared to other service sectors, pharmacy spending grew more slowly over the period—4% from 2006 to 2007 and 3% from 2007 to 2008.

**Drivers of Expenditure Growth (Price vs. Volume):** Price growth was a dominant driver of spending growth for inpatient services, while increases in both price and volume drove expenditure growth for outpatient services, professional services and imaging services.

**Price Variation:** There was substantial price variation among all providers and service type categories. The variation tended to be greater for services provided by hospitals or other facilities than for professionals, however differences of 3 to 4 times were common.

**Expenditures by Insurance Market Sector:** Expenditures per member grew fastest for the self-insured and large groups and slowest for the individual market. Per member expenditures in the individual market declined 2% from 2007 to 2008. This decline may be due to new enrollment of individuals with lower health care needs and also a potential decrease in utilization tied to greater cost sharing. Because of increases in enrollment in the individual market, total expenditures increased for that market segment over the period.

**Member Cost-Sharing:** Enrollment in high-deductible health plans grew from less than 4% of all enrolled lives in 2006 to 11% by 2008 and patient cost sharing (particularly for the individual market) increased as a percent of total spending from 2006 to 2008. In 2008, patients contributed 13% of total health care expenditures in the individual market compared to 6% and 7% in the self-insured and large group markets, respectively.

**Hospital Inpatient Expenditures:** Total spending for hospital inpatient care grew more slowly from 2007-2008 (7%) compared to 2006-2007 (9%). Surgical inpatient stays accounted for the largest share of the expenditure growth over the period. Inpatient spending growth was driven almost entirely by increase in the expenditures per day.

**Outpatient Expenditures:** In MA, acute care hospitals (versus freestanding facilities) provide most of outpatient facility care. Total hospital outpatient spending grew faster than spending in other service categories from 2006-2008, increasing 12 to 13% each year.

**Teaching vs. Non-Teaching Hospital Expenditures:** Teaching hospitals accounted for nearly two-thirds of the spending for inpatient care in 2008 and hence accounted for two-thirds of the growth in inpatient expenditures. The most significant annual growth (15%) was for teaching hospitals outside of the metro-Boston area. Teaching hospitals accounted for just more than one-half of hospital outpatient expenditures and 63% of the hospital outpatient expenditure growth.

**Professional Expenditures:** Expenditures for professional services (MDs and other professionals regardless of setting) increased 8 to 9% per year from 2006-2008. Payments for specialty care accounted for about one-half of the increase in spending for professional services each year. Office visits comprised the majority of expenditure growth in this category.

**Imaging Service Expenditures:** Total spending for imaging services (including both the professional and technical components) increased at a rate of between 9 and 11% per year between 2006 and 2008. Spending for standard imaging, accounted for the largest share of the increase in total spending for imaging between 2006-2007, but spending for MRI's accounted for the largest share of the increase between 2007-2008.



Note: As reported here, spending includes the amounts paid by insurers and self-insured employers to health care providers, as well as patient out-of-pocket expenses for covered services (e.g. co-payments and deductibles). Therefore, these trends include the full cost of health care services even as more of these costs are shifted to consumers with benefit buy down.

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# **1. Health Care Expenditure Growth (Overall)**

# 1.1 Overall Trends in Health Care Expenditures, 2006-2008

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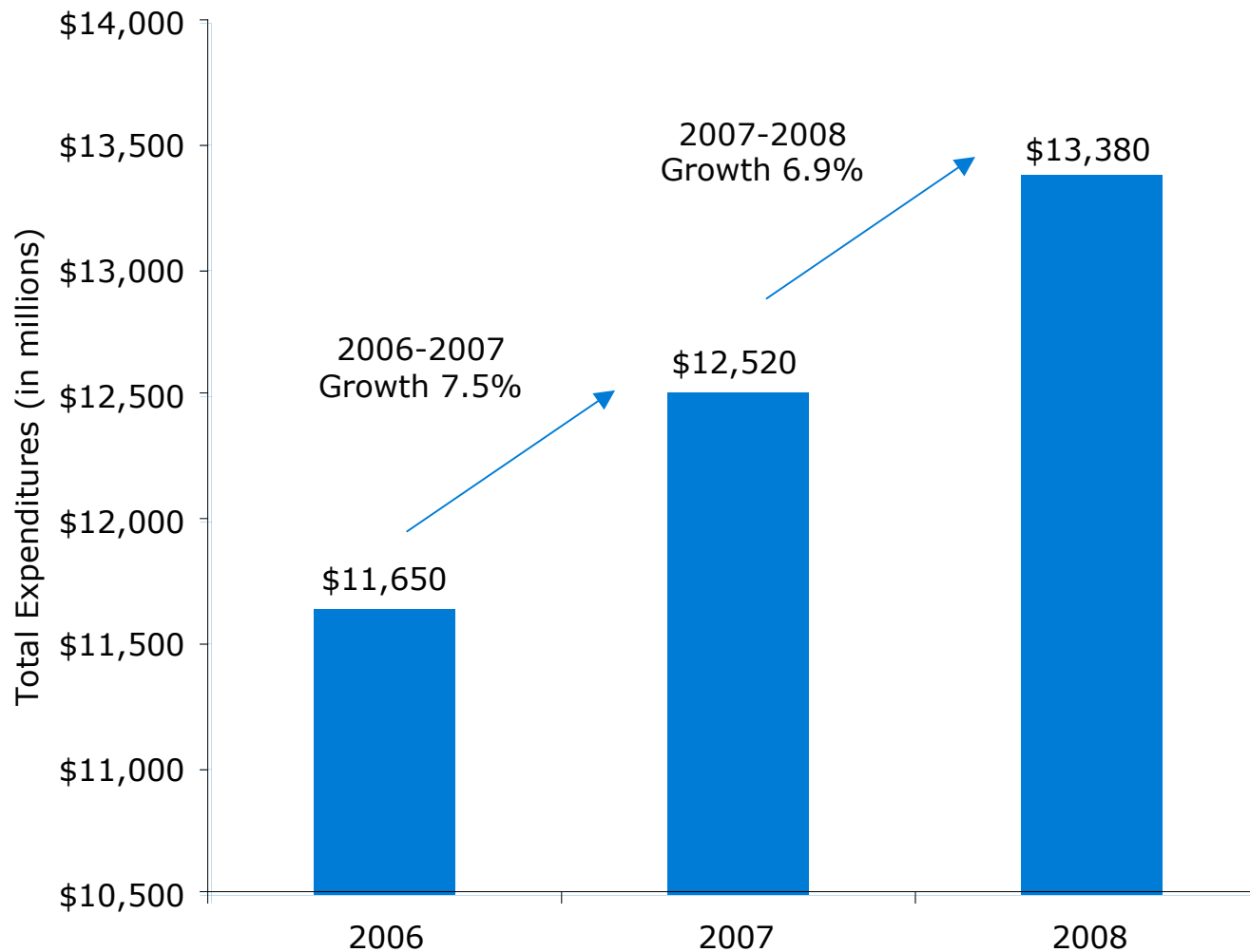
## Findings:

- Health care spending for privately insured grew 7.5% per member, per year from 2006 to 2008. This is significantly higher than the estimated national growth rate--3.9%\* from 2007 to 2008.
- In 2008 professional services and outpatient services comprised the largest share of total spending (57%) and accounted for more than  $\frac{3}{4}$  of the total growth in total spending from 2006 to 2008.
- Total spending on hospital outpatient services grew fastest and at an increasing rate over the period, increasing 11.9% from 2006 to 2007 and another 13.7% between 2007 and 2008. Spending for professional/physician services also increased and accelerated over the period, growing 8.4% from 2006 to 2007 and 9.8% from 2007 to 2008.
- Total spending on hospital inpatient services also grew but the rate of growth slowed from 8.9% in 2007 to 7.9% in 2008, as outpatient spending accelerated. Total spending on pharmaceuticals grew at a slower rate compared to other services, increasing between 2.7% and 3.9% each year.



\*Unlike the MA number, these national health expenditures do not include cost sharing components (e.g. co-pays and deductibles) so increases in the national level of cost sharing might dampen health spending increases.

# Total Expenditures\* and Annual Growth for Privately Insured Health Care in MA



Between 2006 and 2008 privately insured health care expenditures grew by 15%, or \$1.73 billion, reaching nearly \$13.4 billion by 2008.\* The annual rate of growth declined slightly from 7.5% to 6.9%. In part this decline was due to a slight decrease in enrollment represented in the claims data analyzed for this study. Per member, per year expenditures (as shown in the next slide) increased 7.5% in both years.

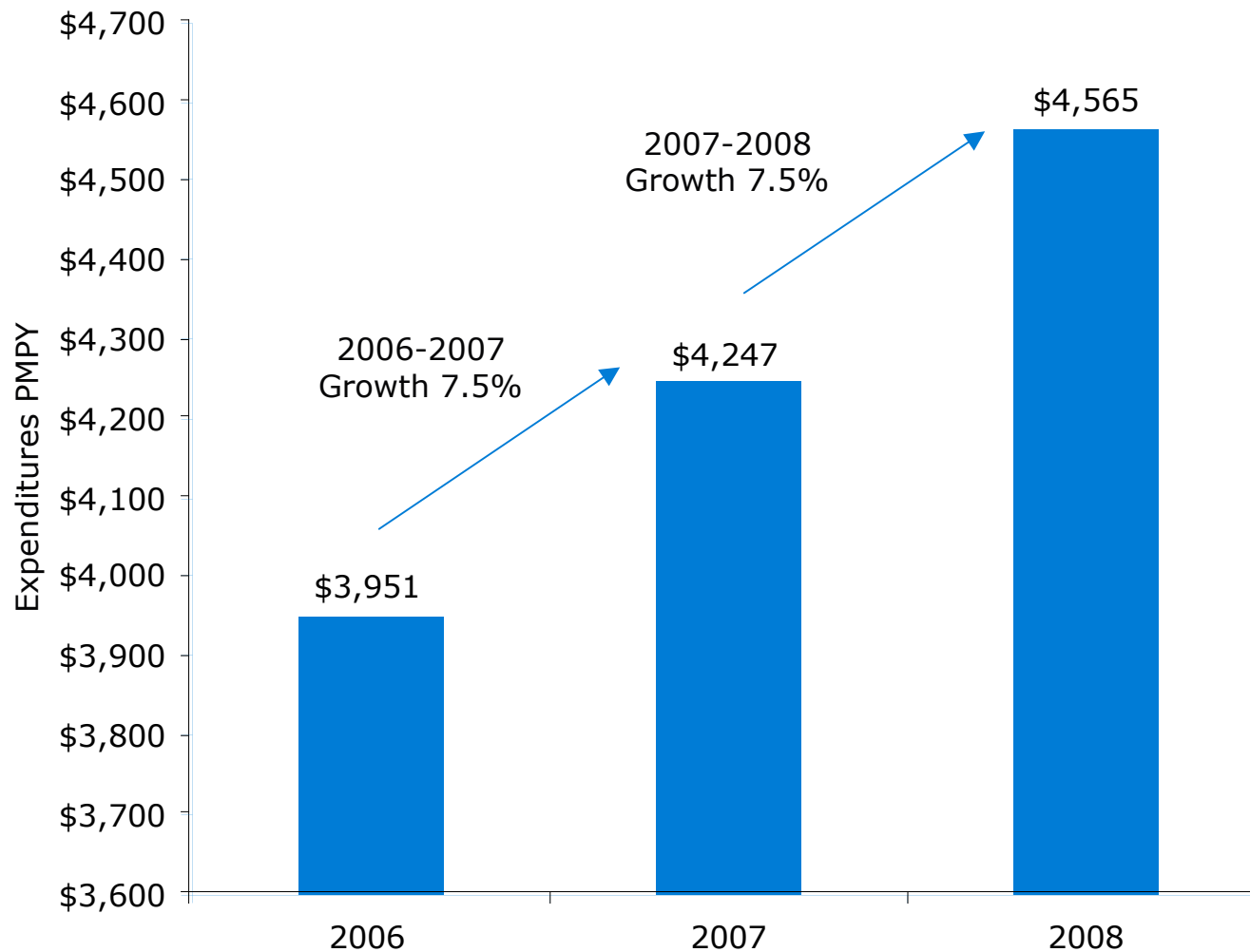
Health care expenditures in MA increased at a substantially faster rate than the U.S. average (3.9%).\*\*

\*Total expenditures in this report, represent about 2/3 of privately insured lives and just under one-half of all covered lives (including publicly insured). Expenditure totals presented, therefore, under-represent total state spending in each year.

Capitation adjustments and other payments reported by carriers that did not flow through the claims system are included here. Source for national comparison: Hartman, M. et al., "Health Spending Growth At A Historical Low in 2008", Health Affairs 29, No.1 (2010)

\*\*Unlike the MA number, these national health expenditures do not include cost sharing components (e.g. co-pays and deductibles). Increases in cost-sharing nationally would dampen the growth in health care spending nationally.

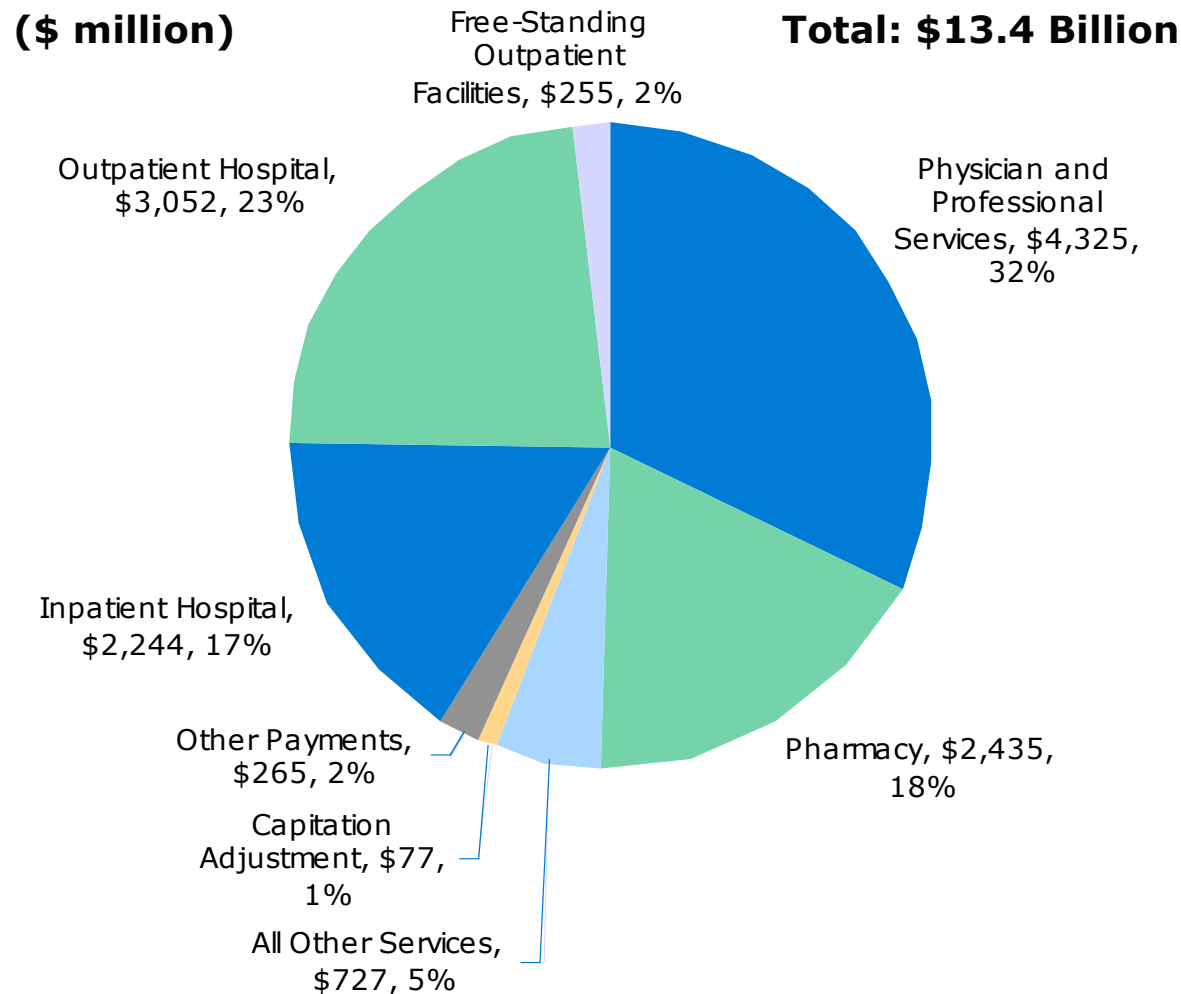
# Expenditures per Member and Annual Growth for Privately Insured Health Care in MA



Expenditures per member increased 7.5% per year from 2006 to 2008.



# Distribution of Privately Insured Expenditures by Type of Service, 2008



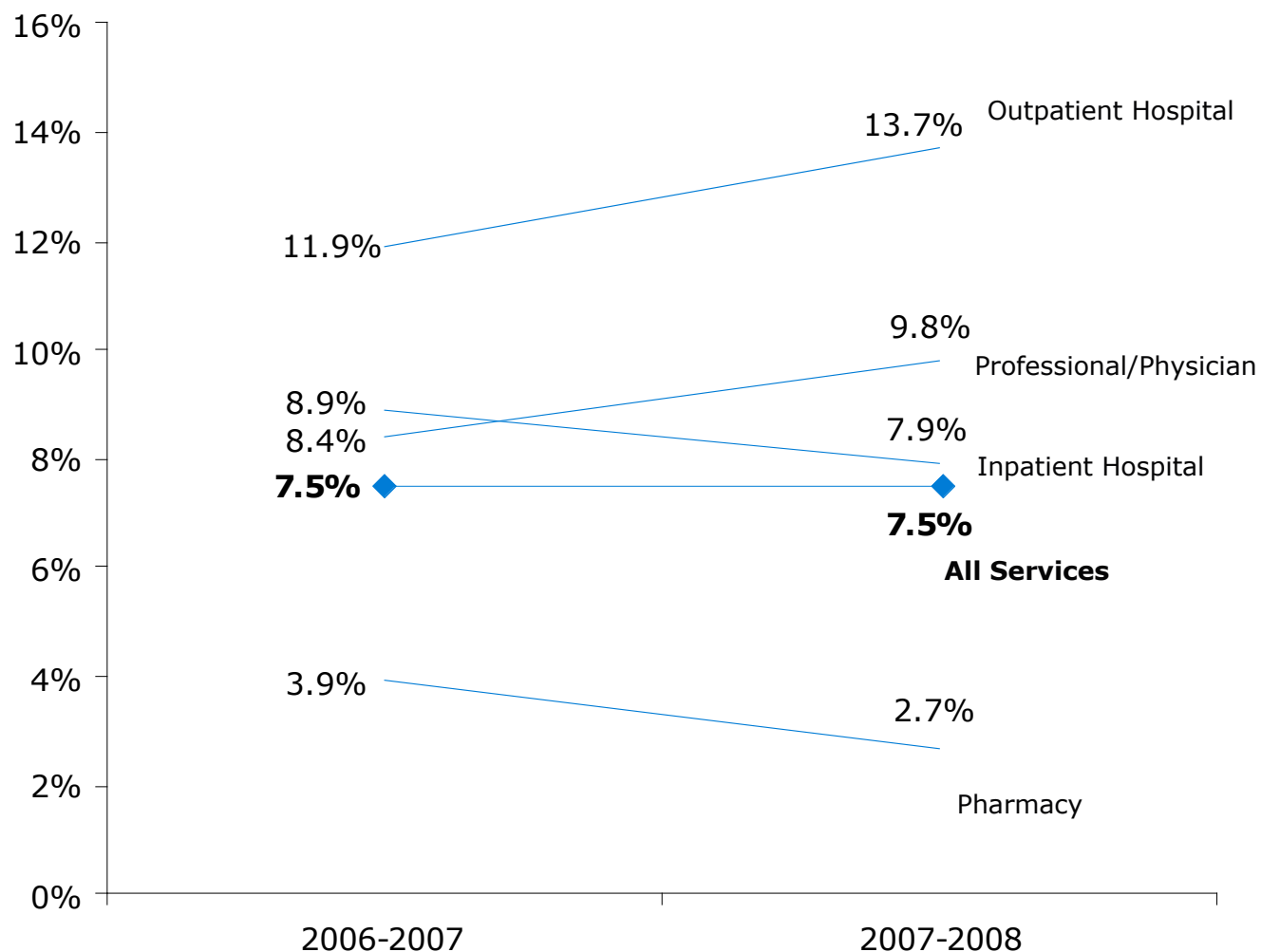
In 2008, professional services and outpatient facility services (both hospital and free-standing) comprised the largest categories of spending, together accounting for 57% of total spending for covered services.

Prescription drugs (18%) accounted for nearly the same share of total spending as inpatient hospital care (17%).

Spending for care obtained in free-standing outpatient facilities (lower cost settings) made up just 2% of total spending.

**Notes:** Inpatient and outpatient facility expenditures exclude professional services billed separately. "All other services" includes skilled nursing facilities, non-acute institutional care, and other unclassified claims. Capitated claims are valued at the fee-for-service equivalent. The capitation adjustment reconciles total capitation payments and the FFS equivalents that carriers reported at the claims level; other reported payments include pay-for-performance incentive payments and network management fees that did not flow through the claims system.

# Annual Growth in Privately Insured Expenditures per Member, by Major Type of Service

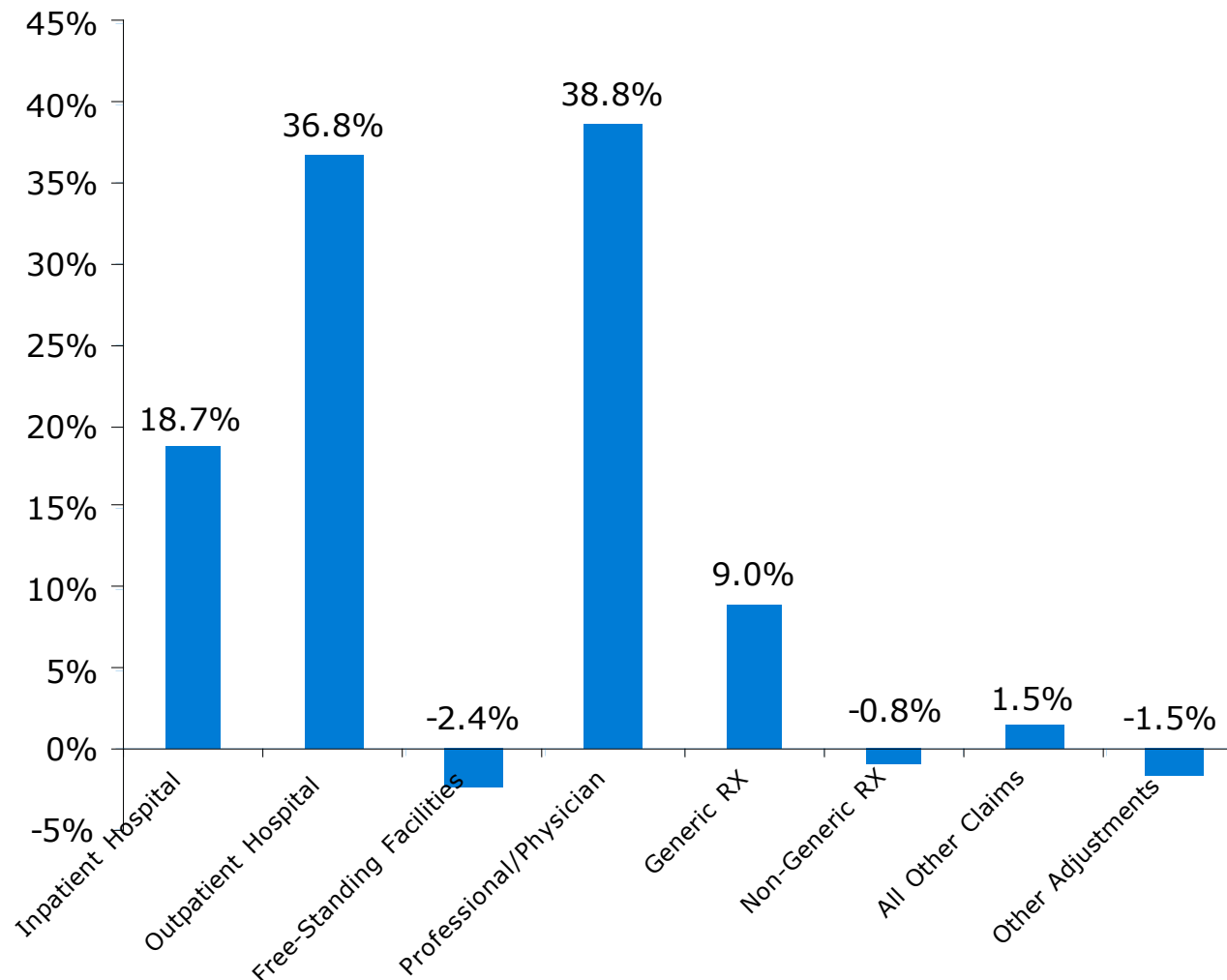


While spending in most service categories grew substantially, spending for both outpatient hospital services and professional/physician services accelerated compared with spending for inpatient hospital services.

Pharmacy spending grew most slowly among service types, increasing 3.9% from 2006 to 2007 and another 2.7% from 2007 to 2008.

Free-standing facilities (not shown), which make up just 2% of total health care expenditures, decreased 7% each year.

# Contribution of Service Sectors to the Growth in Total Expenditure, 2006-2008



Increased spending for physician and other professional services accounted for the largest share of total spending growth from 2006 to 2008 (39%). Hospital outpatient care contributed to the second largest share of spending growth (37%). The large contribution for these two service groups reflects significant annual increases in per member costs.

Although pharmacy spending accounted for a significant share of health care spending (18%), it grew at a slower rate compared to other services (2.7% to 3.9%). Pharmacy spending contribution to growth, therefore, was proportionately smaller at 9.0% for generic and -0.8% for non-generic.



**Notes:** Inpatient and outpatient facility expenditures exclude professional services billed separately. All other claims includes skilled nursing facilities, non-acute institutional care, and other unclassified claims. Capitated claims are valued at the fee-for-service equivalent. Other adjustments include reconciliation of total capitation payments and the FFS equivalents that carriers reported at the claims level, plus other reported payments (such as pay-for-performance incentive payments and network management fees) that did not flow through the claims system.

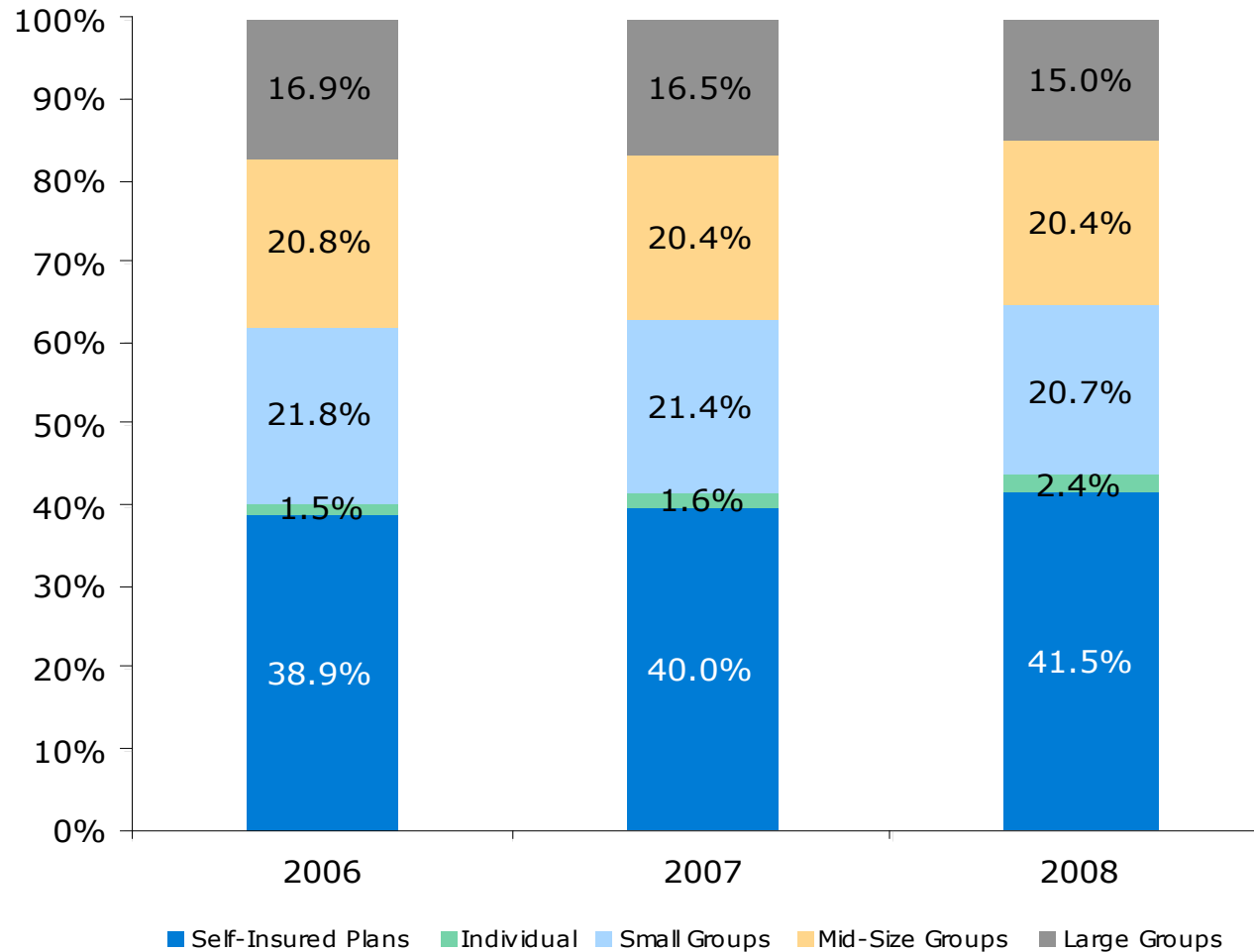
## 1.2 Overall Health Expenditures by Insurance Market Segment

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### Findings:

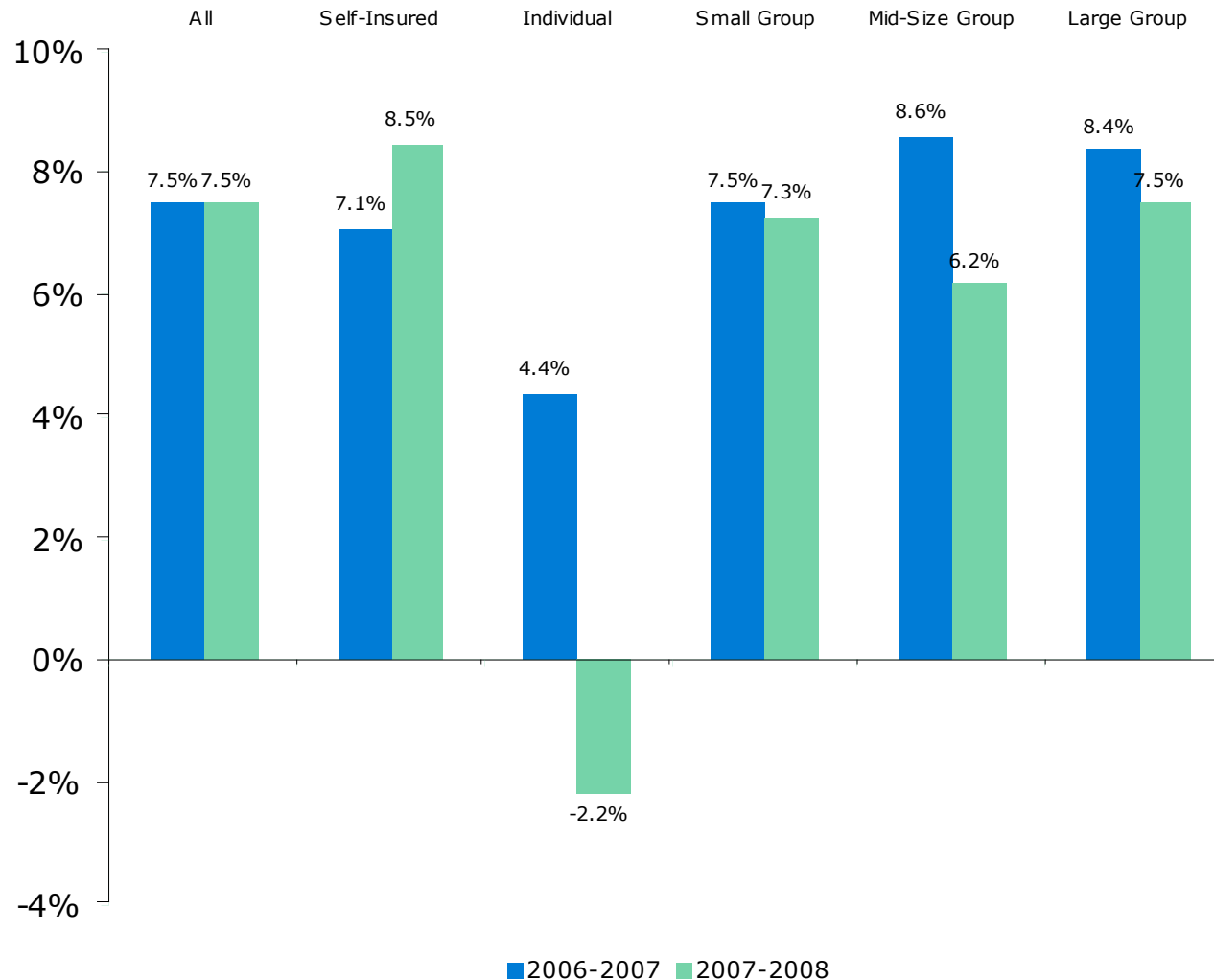
- Between 2006 and 2007 there was a shift of insured lives toward self-insured plans and growth in the number of people with individual coverage.
- On a per member basis, expenditures grew fastest for the self-insured and large groups and slowest for the residents in the individual market.
- Despite the slower growth, per member spending among individual plans remained much higher than spending in other insured or self-insured groups. Per member spending among individual plans was 20% to 40% higher compared to self-insured and fully insured group plans in 2008.

# Distribution of Private Insurance Enrollment by Insurance Market Segment



Self-insured plans made up an increasing share of enrollment, accounting for 41.5% of enrollees in 2008. Those in fully-insured group plans made up 56.1%, while individual enrollment was 2.4%, also an increase from 2006.

# Annual Growth in Expenditures per Member by Insurance Market Segment

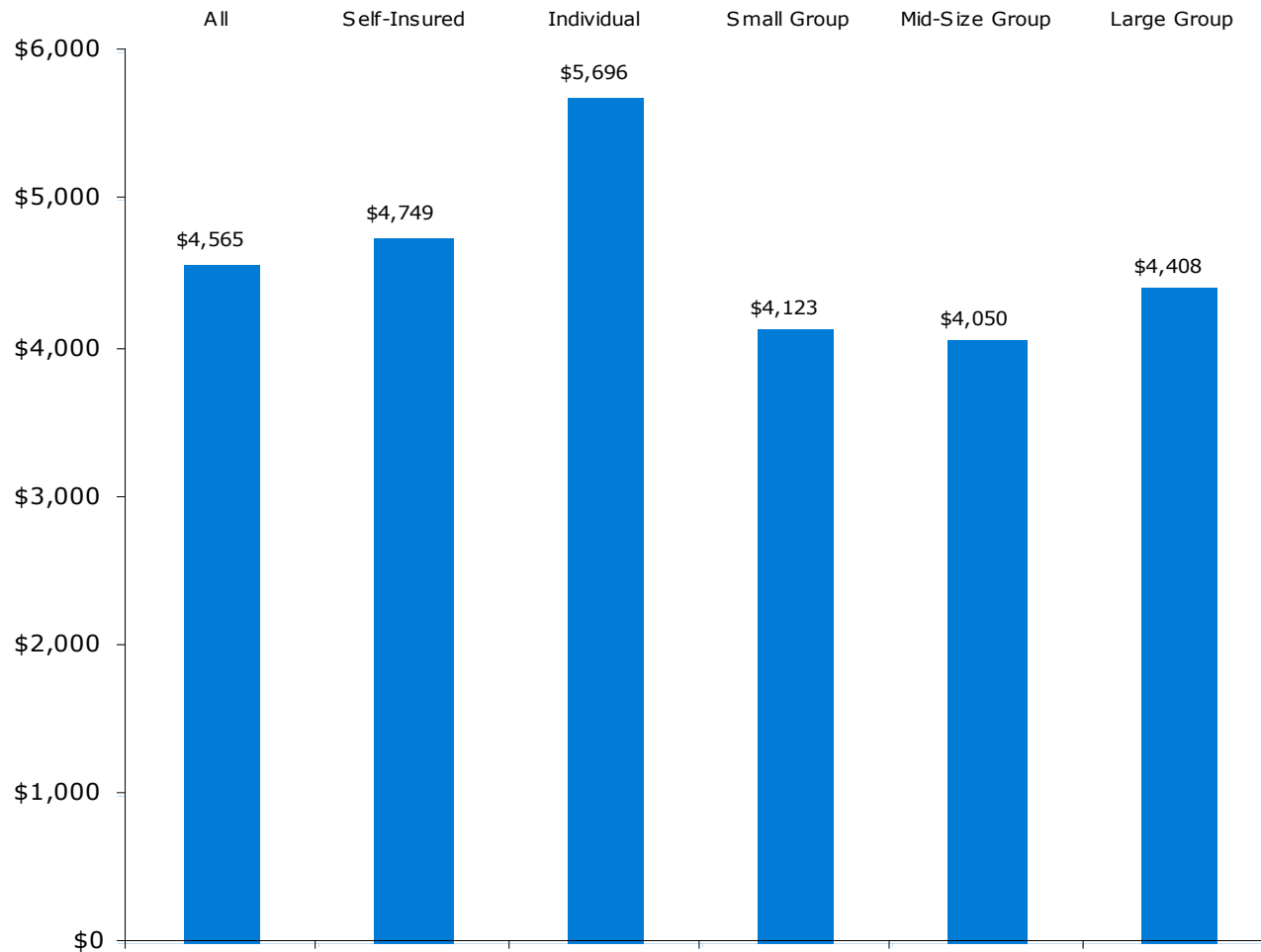


Spending per member among individually insured residents grew 4% in 2007 and declined in 2008. This pattern of growth is likely related to new enrollment of individuals with lower health care needs and also the purchase of individual plans with greater cost sharing which may impact utilization.

Expenditures per member grew more slowly in 2007-2008 than in 2006-2007 for all of the insurance market sectors except for the self-insured plans which grew faster.

**Notes:** Capitation adjustments and other payments reported by carriers that did not flow through the claims system are excluded in the market sector detail, but included in all-enrollees expenditures.

# Per Member per Year Expenditure Levels by Insurance Market Segment, 2008



Per member spending among individuals remained much higher than among insured or self-insured groups, at least in part reflecting the older average age of enrollees with individual coverage.

The lowest per member spending was in small and mid-size group plans.



**Notes:** Capitation adjustments and other payments reported by carriers that did not flow through the claims system are excluded in the market segment detail, but included in all-enrollees expenditures.

## 1.3 Member Cost Sharing

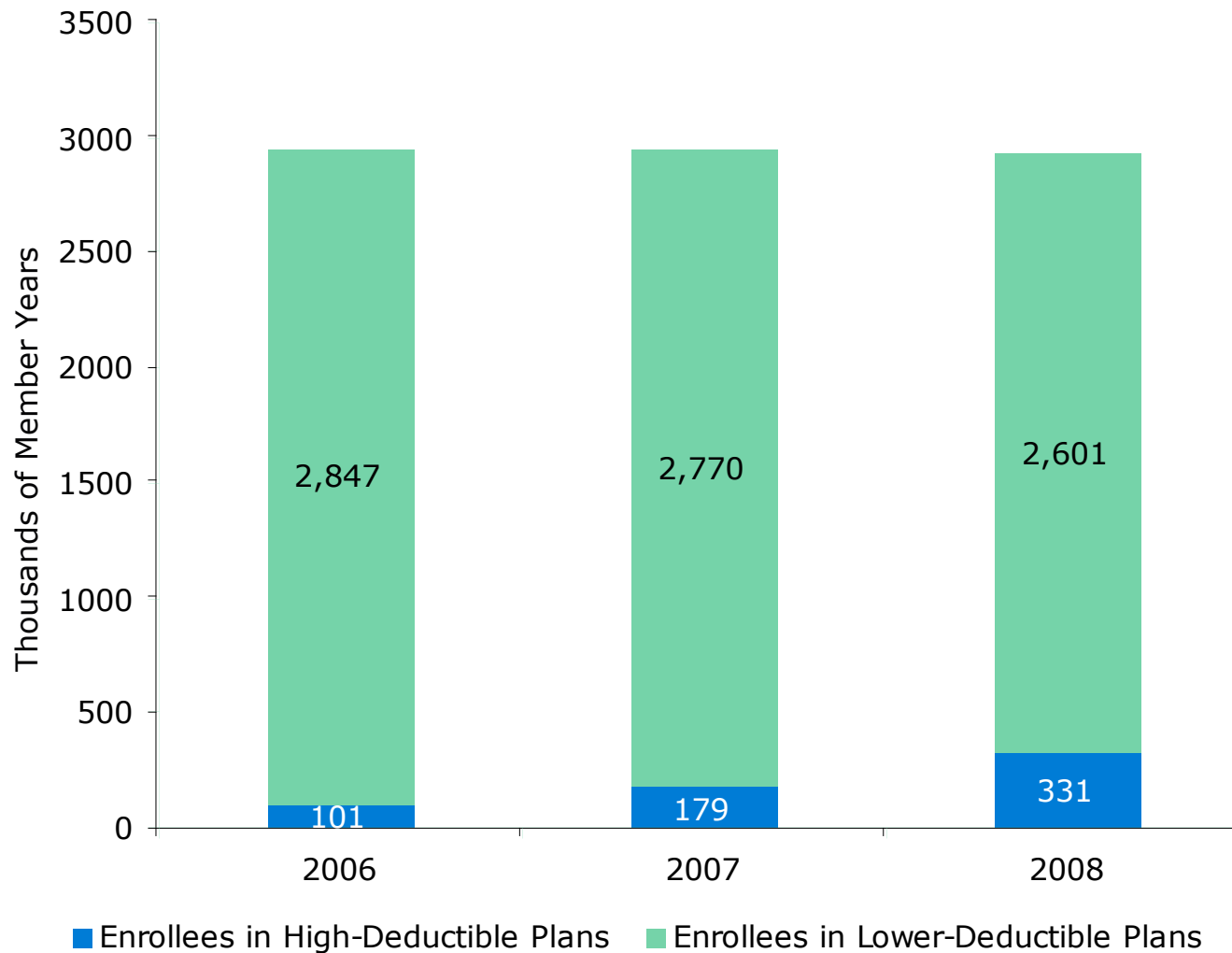
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### Findings:

- Enrollment in high-deductible health plans grew from less than 4% of all enrolled lives in 2006 to 11% by 2008.
- Patient cost-sharing increased as a percent of total spending from 2006 to 2008, particularly for residents in the individual market but also for small and mid-size groups. However, in self-insured and large groups, average member cost-sharing declined.
- In 2008, consumers contributed 13% of total health care expenditures in the individual market compared to 6% and 7% in the self-insured and large group markets, respectively.



# Enrollment in Privately Insured High-Deductible Plans

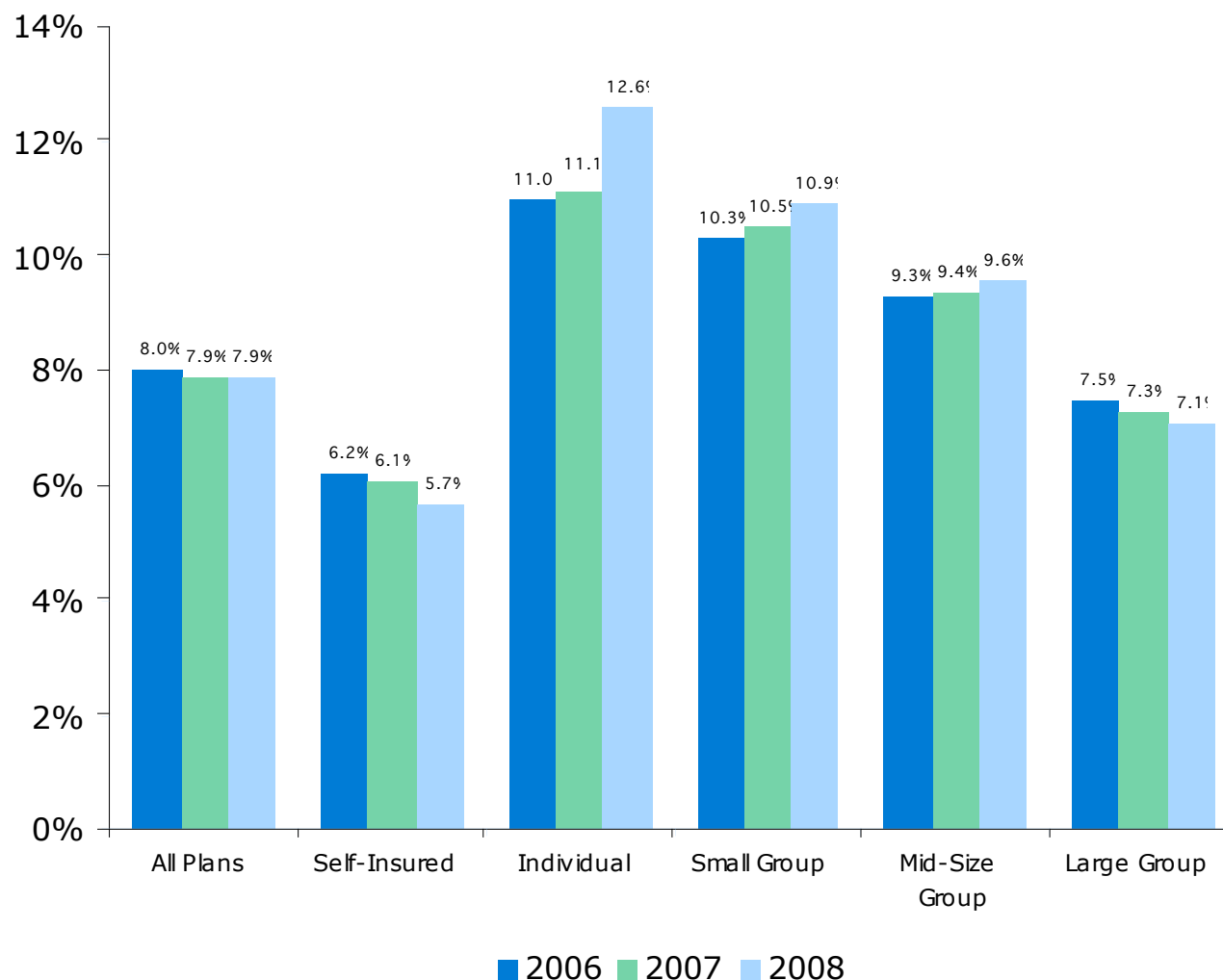


Enrollment in high-deductible health plans grew from less than 4% of all enrolled lives in 2006 to 11% in 2008.



**Notes:** High-deductible plans are plans with a deductible above \$1,000.

# Consumer Cost Sharing as a Percent of Total Expenditures by Insurance Market Sector



Consistent with greater enrollment in high-deductible plans, patient cost sharing increased as a percent of total spending from 2006 to 2008, particularly for individuals, small and mid-size groups. However, in self-insured and large groups, cost sharing declined.

By 2008, consumers in the individual market contributed 13% of the total expenditures through cost-sharing arrangements compared to 6% for the self-insured market.

**Notes:** Cost sharing includes deductibles, coinsurance amounts, and copayments, but do not include consumer (or employee contributions to) premiums. Capitated claims and claims with third party payers are excluded.

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## **2. Hospital Inpatient Expenditures**

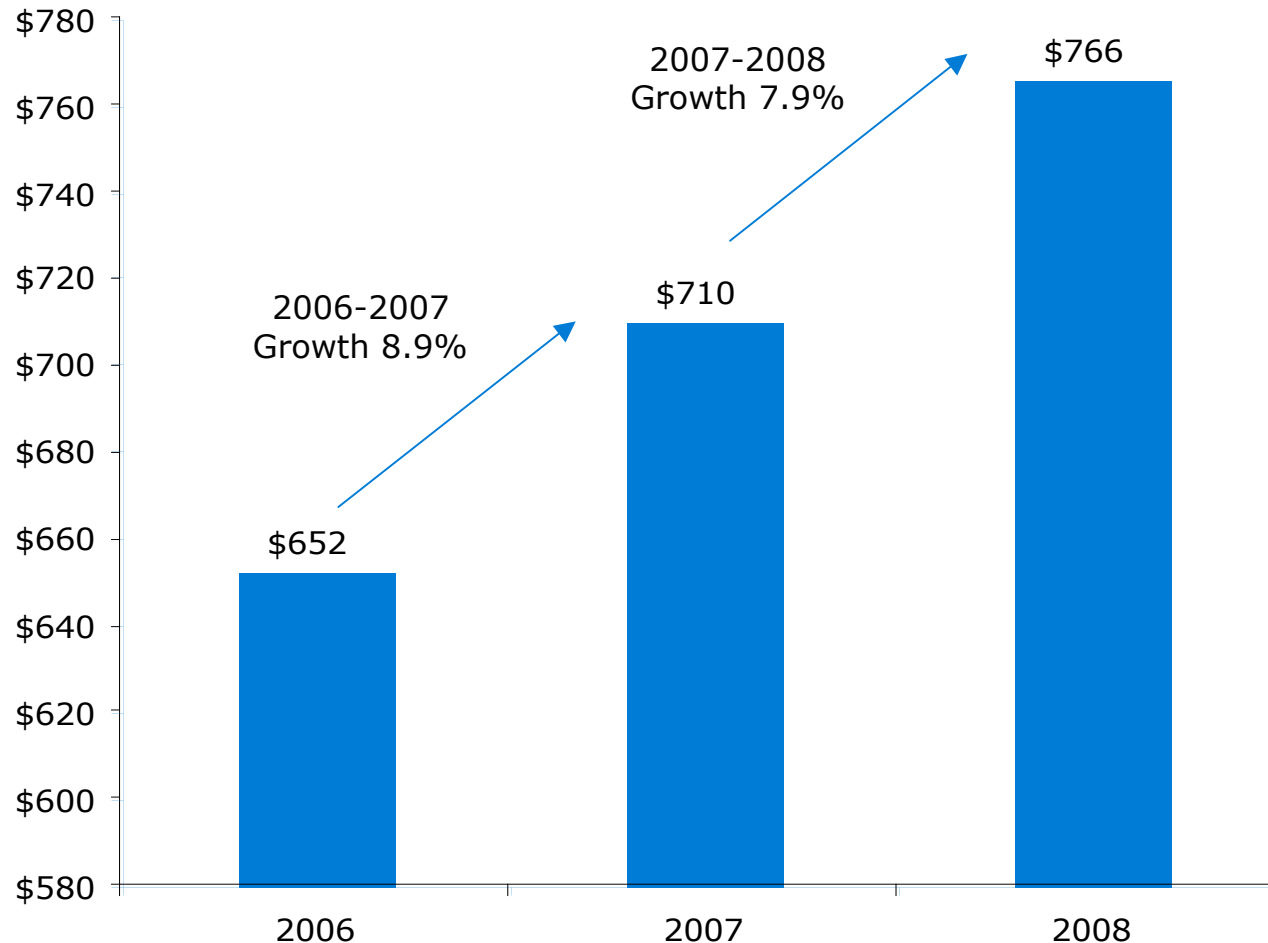
## 2.1 Spending Growth for Hospital Inpatient Care, 2006-2008

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### Findings:

- Per member spending for privately insured hospital inpatient care increased 8.9% from 2006 to 2007 and another 7.9% from 2007 to 2008.
- Surgical inpatient stays accounted for more than one-half of the hospital inpatient spending and spending growth from 2006 to 2008.
- Although each inpatient service type experienced substantial increases in expenditures throughout the period, the rate of growth in spending for maternity stays was slower in 2007 to 2008 compared with 2006 to 2007.

# Privately Insured Hospital Inpatient Expenditures Per Member and Annual Growth

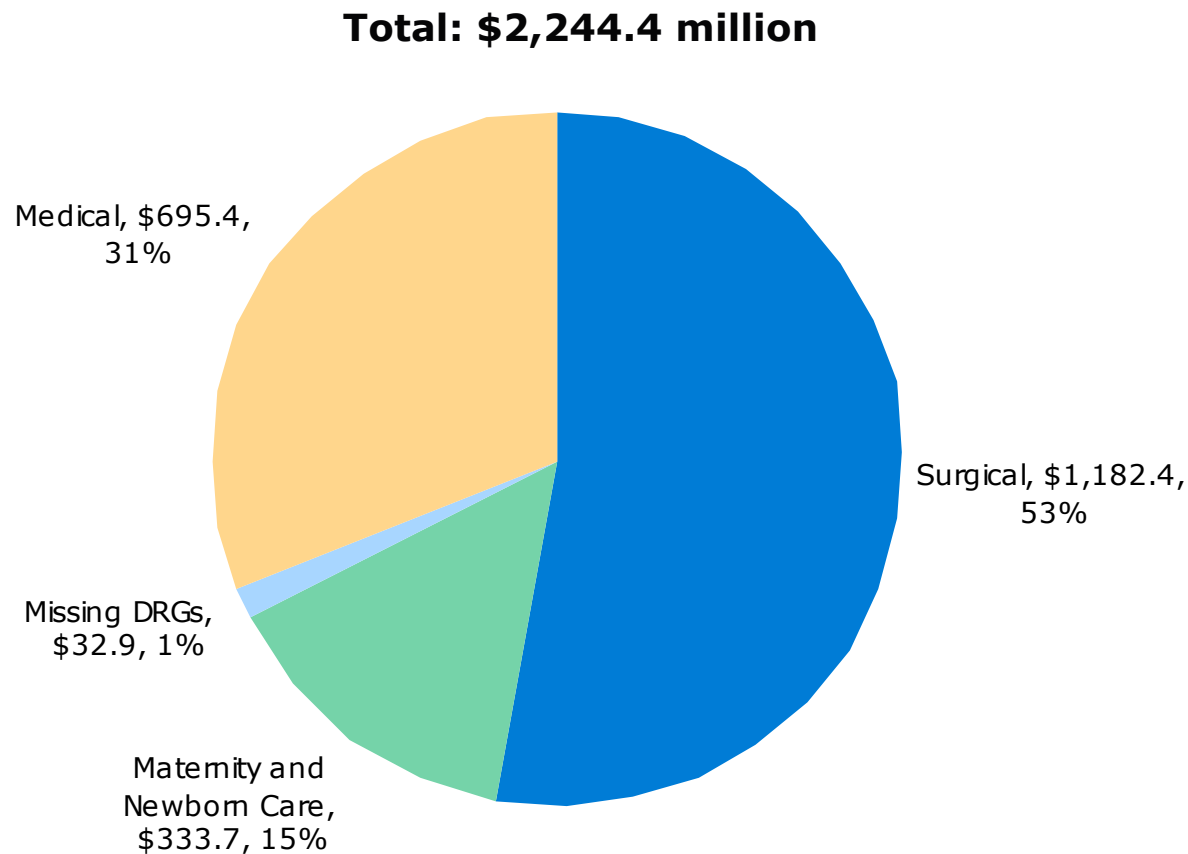


Hospital inpatient expenditures per member grew 17.5% from 2006 through 2008. Spending increased substantially for all inpatient categories in both periods, however, the rate of growth slowed somewhat in 2008. The slowing growth rate from 2007 to 2008 compared to 2006 to 2007 reflected a slower increase in spending for maternity inpatient stays and a slightly smaller increase in spending for surgical stays.



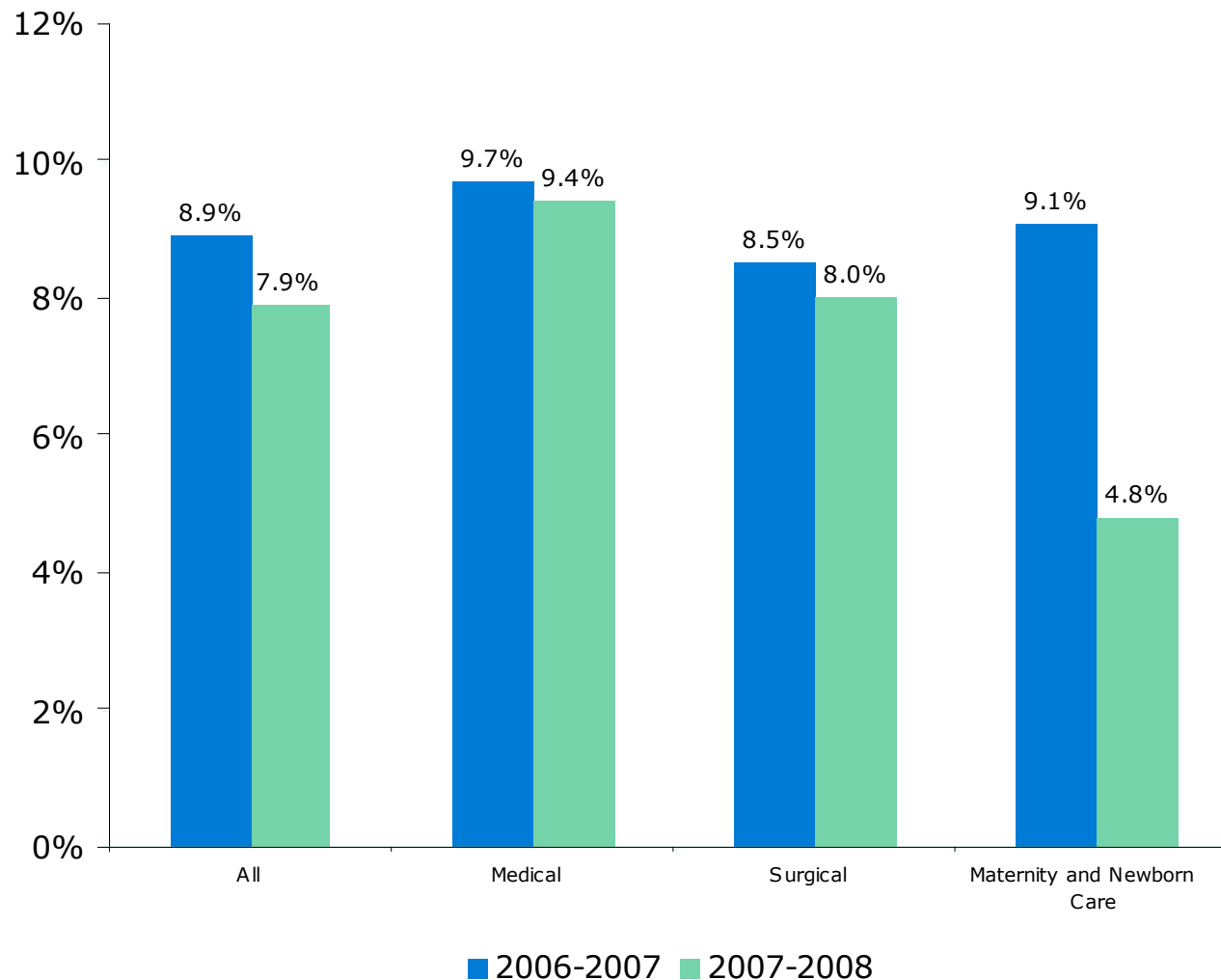
**Notes:** Data only include facility charges for care provided at acute inpatient facilities. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

# Distribution of Hospital Inpatient Expenditures by Type of Service, 2008



In 2008, surgical DRGs accounted for more than half of total spending for inpatient care (53%). Medical DRGs accounted for about 31%.

# Annual Growth in Inpatient Hospital Care PMPY by Type of Service

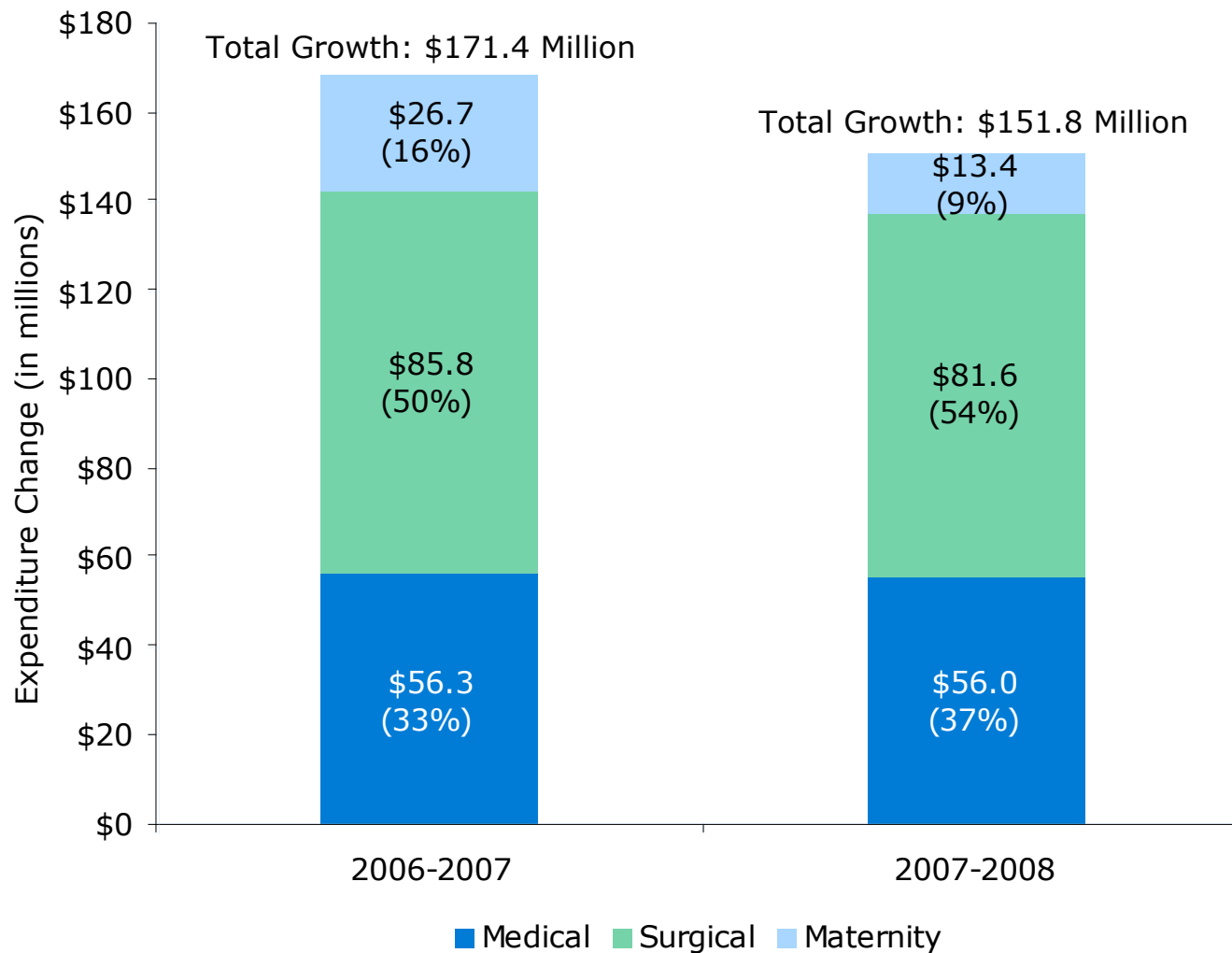


Spending for non-surgical inpatient stays per member increased 9.4 to 9.7% each year between 2006 to 2008 while spending for surgical inpatient stays increased 8.0 to 8.5% each year.

Per member spending for maternity and newborn care increased more significantly in 2006 to 2007 (9.1%) compared to 2007 to 2008 (4.8%).

**Notes:** Data only include facility charges for care provided at acute inpatient facilities and exclude missing DRGs. One data source is excluded in the calculation of average length of stay because the discharge date is missing on the inpatient data file. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions and days were adjusted for missing data in 2007 and 2008.

# Contribution of Service Types to Annual Growth of Hospital Inpatient Expenditures



Hospital inpatient expenditures grew more than \$150 million in each time period. The growth, however, decreased from a \$171.4 million increase in 2006-2007 to \$151.8 million in 2007-2008.

Expenditures for surgical inpatient stays accounted for more than half of the total growth of inpatient expenditures in both years and this contribution became more important in 2008 than in 2007.

From 2006 to 2007, maternity DRGs were nearly 16% of the total expenditure growth but 9% in 2007 to 2008.

**Notes:** Data only include facility charges for care provided at acute inpatient facilities. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Hospitalizations with unknown or unclassifiable DRGs are not displayed. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.



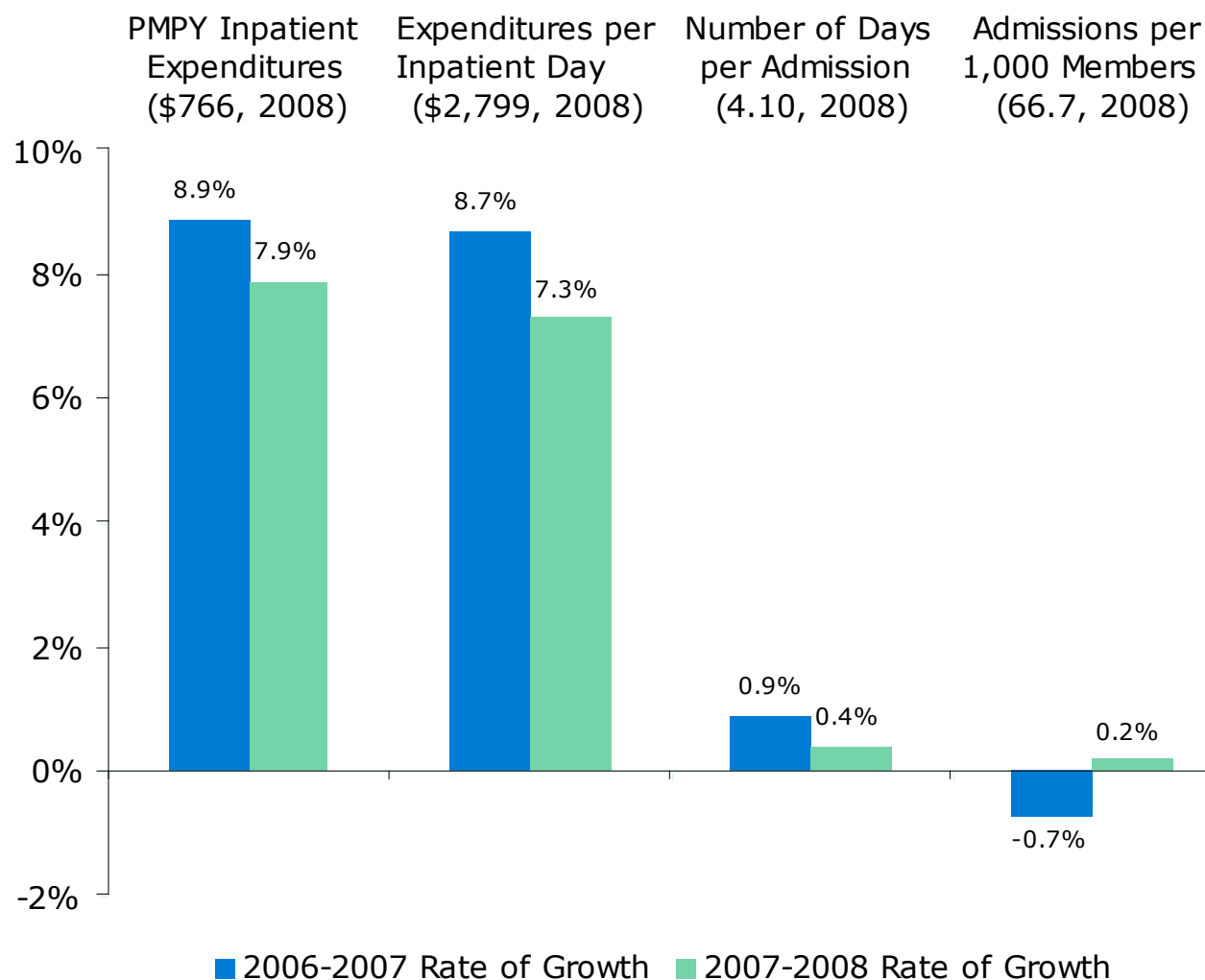
## 2.2 Hospital Inpatient Expenditures: Price Versus Volume, 2006-2008

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### Findings:

- Prices paid for services were the dominant driver of growth in spending for hospital inpatient care, while utilization of hospital inpatient care and service mix grew modestly, if at all.
- The number of inpatient admissions per member and number of days per admission was relatively flat from 2006 to 2008 while the expenditures per day increased between 7 to 9% each year.
- There was substantial variation in the prices paid for the same DRG within both teaching and non-teaching hospitals. The highest prices paid were typically 3 to 4 times, to as much as 7 times the lowest prices paid for the same DRG.

# Change in Hospital Inpatient Expenditures per Member per Year, 2006-2008

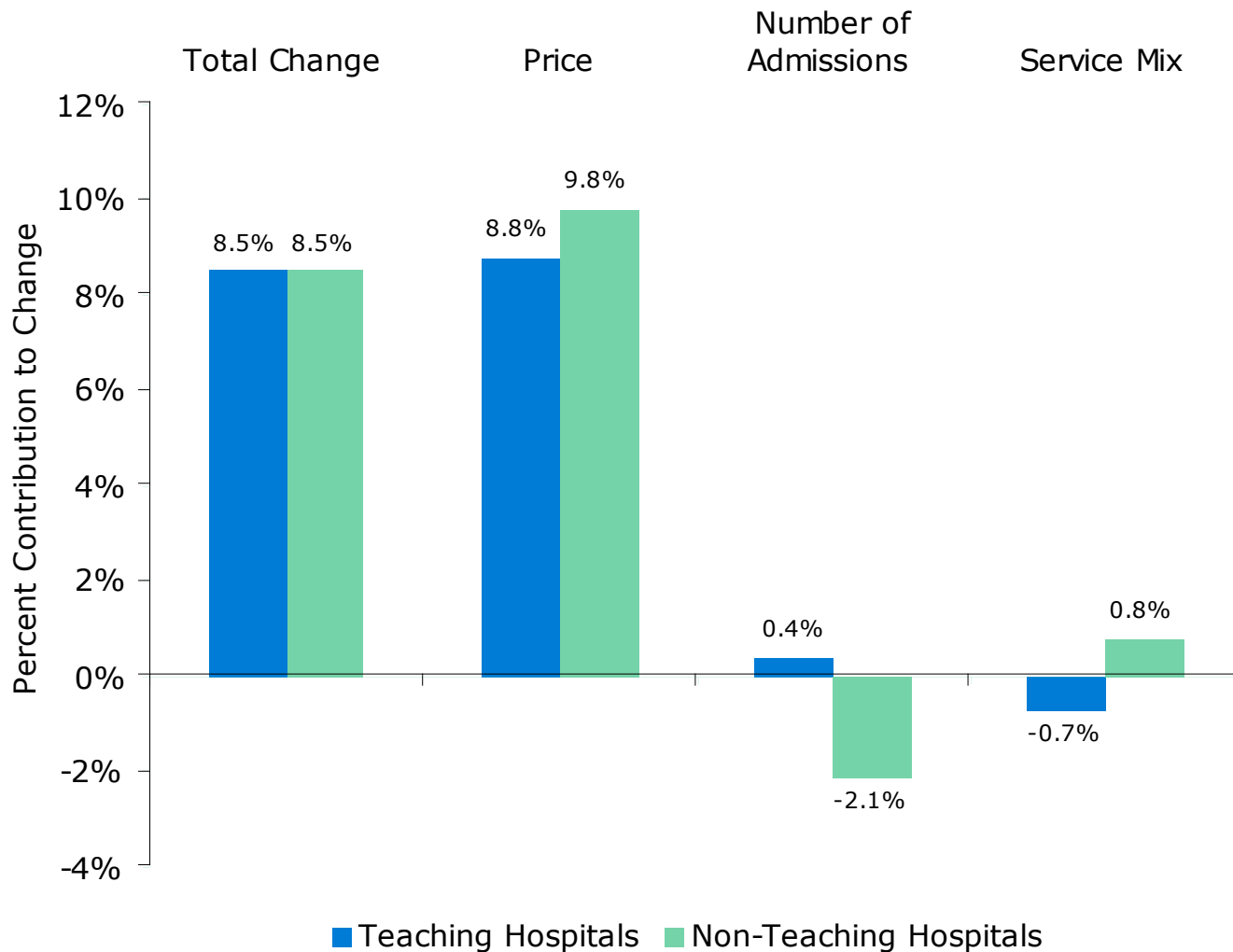


In both 2006-2007 and 2007-2008, most of the growth in average spending for inpatient care was associated with increased growth in spending per inpatient day (8.7% and 7.3%, respectively). Both the rate of admissions (per 1,000 member years) and the average length of stay showed little to no growth in either time periods.

Note: Expenditures per service is calculated as the sum of expenditures divided by the number of services and can be considered a proxy for price. However, we recognize that average expenditures are affected by shifts in the mix of services to higher or lower priced services. The next slide provides a price measure that controls for that shift in service mix and represents a more accurate measure of changes in actual unit prices.

**Notes:** Data only include facility charges for care provided at acute inpatient facilities and exclude missing DRGs. One data source is excluded in the calculation of average length of stay because the discharge date is missing on the inpatient data file. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions and days were adjusted for missing data in 2007 and 2008; see methods appendix for details.

# Drivers of Change (Price v. Volume) in Total Hospital Inpatient Expenditures, 2006-2007

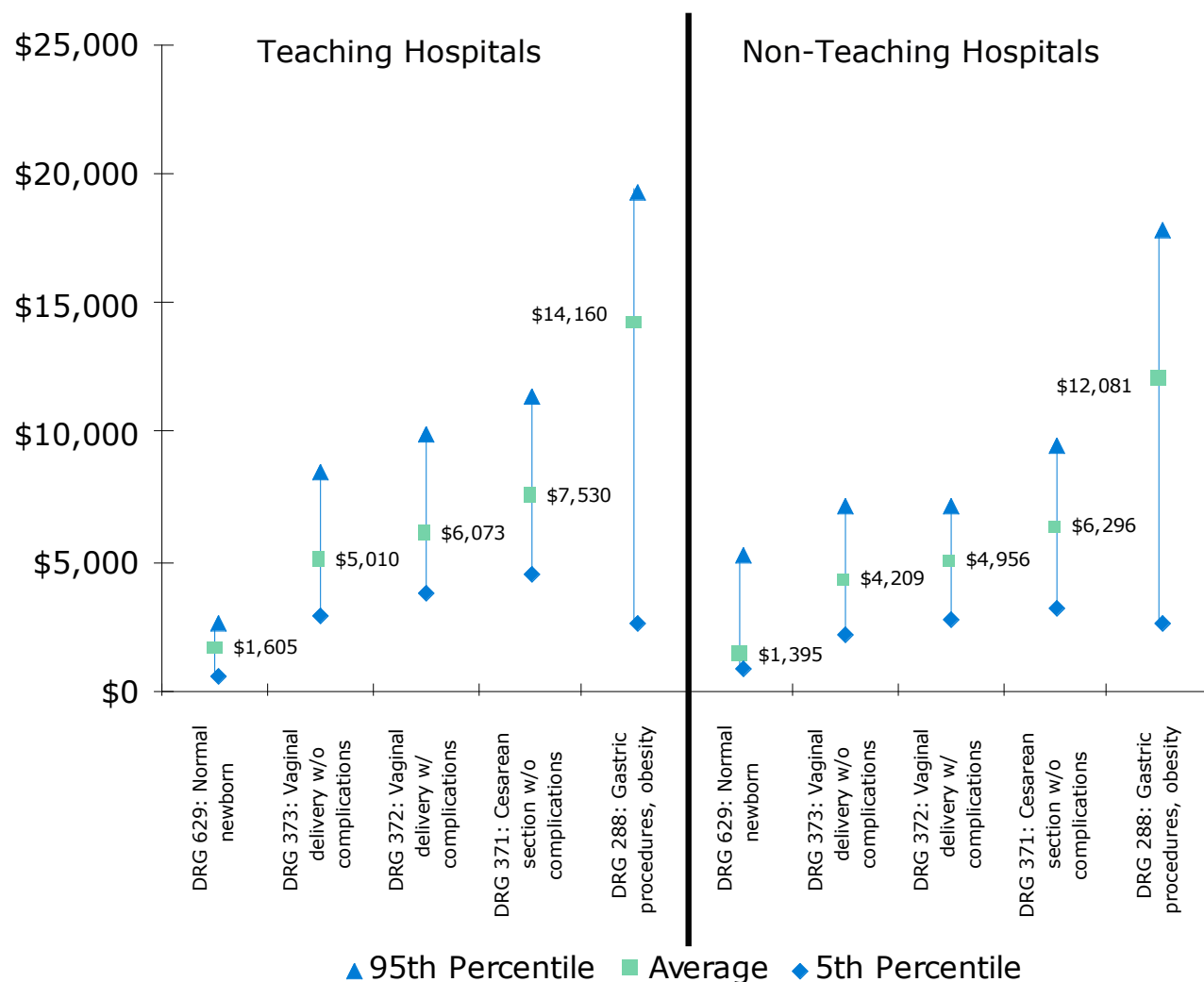


From 2006 to 2007, price increases were the dominant driver of growth in spending for inpatient services, for both teaching and non-teaching hospitals.

Note: To more accurately measure unit price changes, it is important to isolate price versus volume and service mix changes. To do this, we constructed a market basket that included services that occurred consistently in the years of comparison. We then decomposed its component parts: change due to price while holding utilization constant, and change due to volume while holding price constant and the remaining change due to service mix (a shift to higher or lower cost services). We are unable to control for shifting to higher cost settings. That effect is captured in the price component. For this decomposition analysis only the change from 2006 to 2007 is available. (see technical appendix in full report).

**Notes:** Data only include facility charges for care provided at acute inpatient facilities. The change in the number of admissions combines changes in the number of insured member months and the number of admissions pmpm. Certain carriers and claims are excluded; see decomposition methods in the appendix for more detail...

# Price Variation for Selected High-Frequency DRGs, 2008



Among the DRGs presented here, the greatest price variation in high-frequency DRGs was for gastric procedure for obesity performed in teaching hospitals. The highest price paid (95<sup>th</sup> percentile) for gastric procedures was more than seven times the lowest (5<sup>th</sup> percentile). In non-teaching hospitals, the average price for the gastric by-pass procedure was lower (\$12,081 vs. \$14,160) but the variation in price was similar to that among teaching hospitals.

**Notes:** Data include facility charges only for care provided at acute inpatient facilities. Percentiles are calculated and compared by carrier, and only the highest 95th percentile and the lowest 5th percentile are presented, together with average price across all carriers. The services chosen are those that represented the highest expenditures and highest volume.

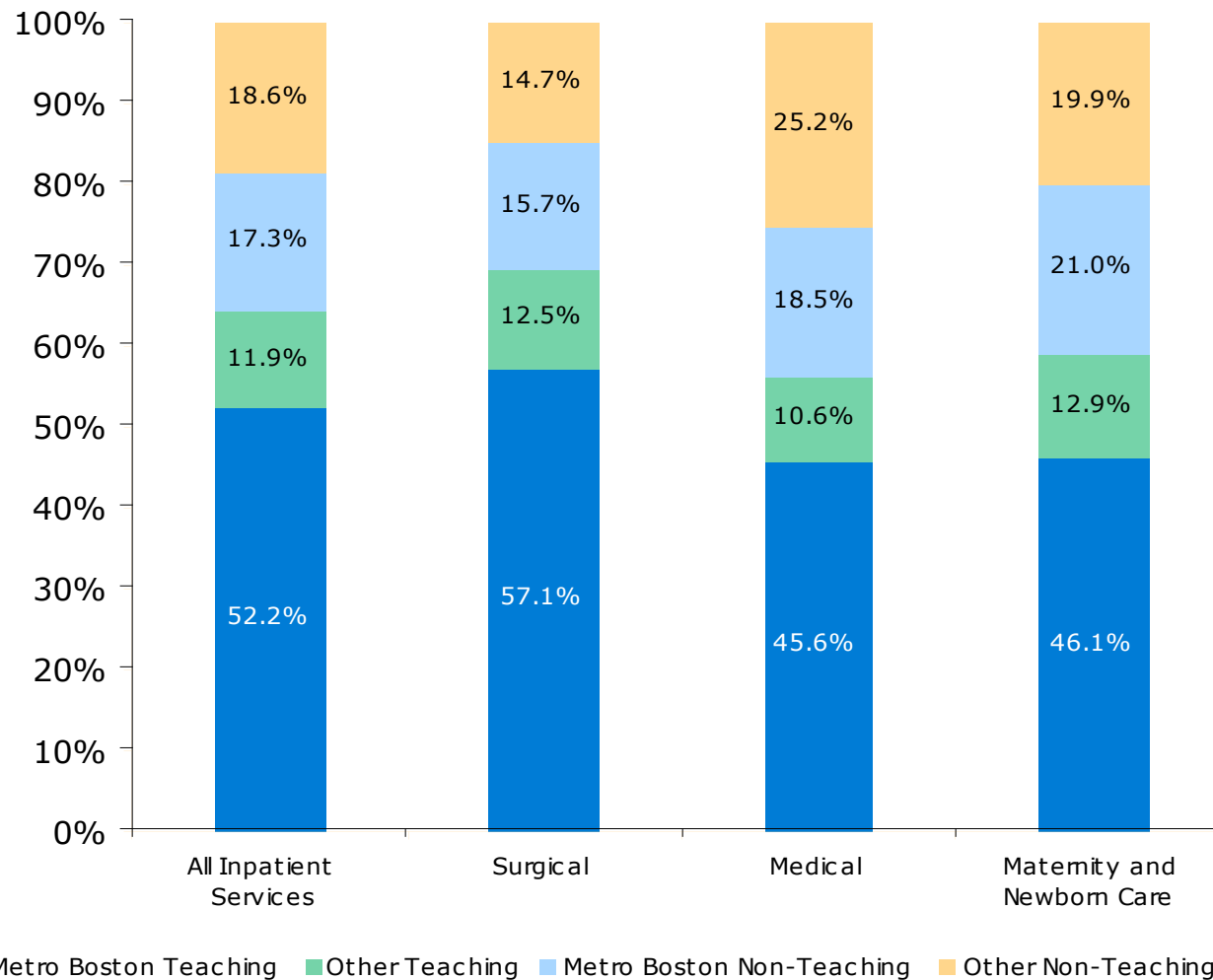
## 2.3 Hospital Inpatient Expenditure Growth for Teaching versus Non-Teaching Hospitals, 2006-2008

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### Findings:

- Teaching hospitals accounted for about two-thirds of hospital inpatient spending and an even greater share (70%) in spending for inpatient surgical care.
- There was significant growth in expenditures in both teaching and non-teaching hospitals over the period, ranging from 4 to 15% per year. The most significant annual growth (15%) was for teaching hospitals outside the metro-Boston area.
- Within the metro-Boston area, non-teaching hospitals experienced faster growth than did teaching hospitals from 2006 through 2008.
- There were slight changes in the number of admissions at teaching and non-teaching hospitals throughout the period. Most substantial was a decrease of 3% per year for non-teaching hospitals outside the metro-Boston area.

# Distribution of Hospital Inpatient Expenditures by Teaching Status, 2008

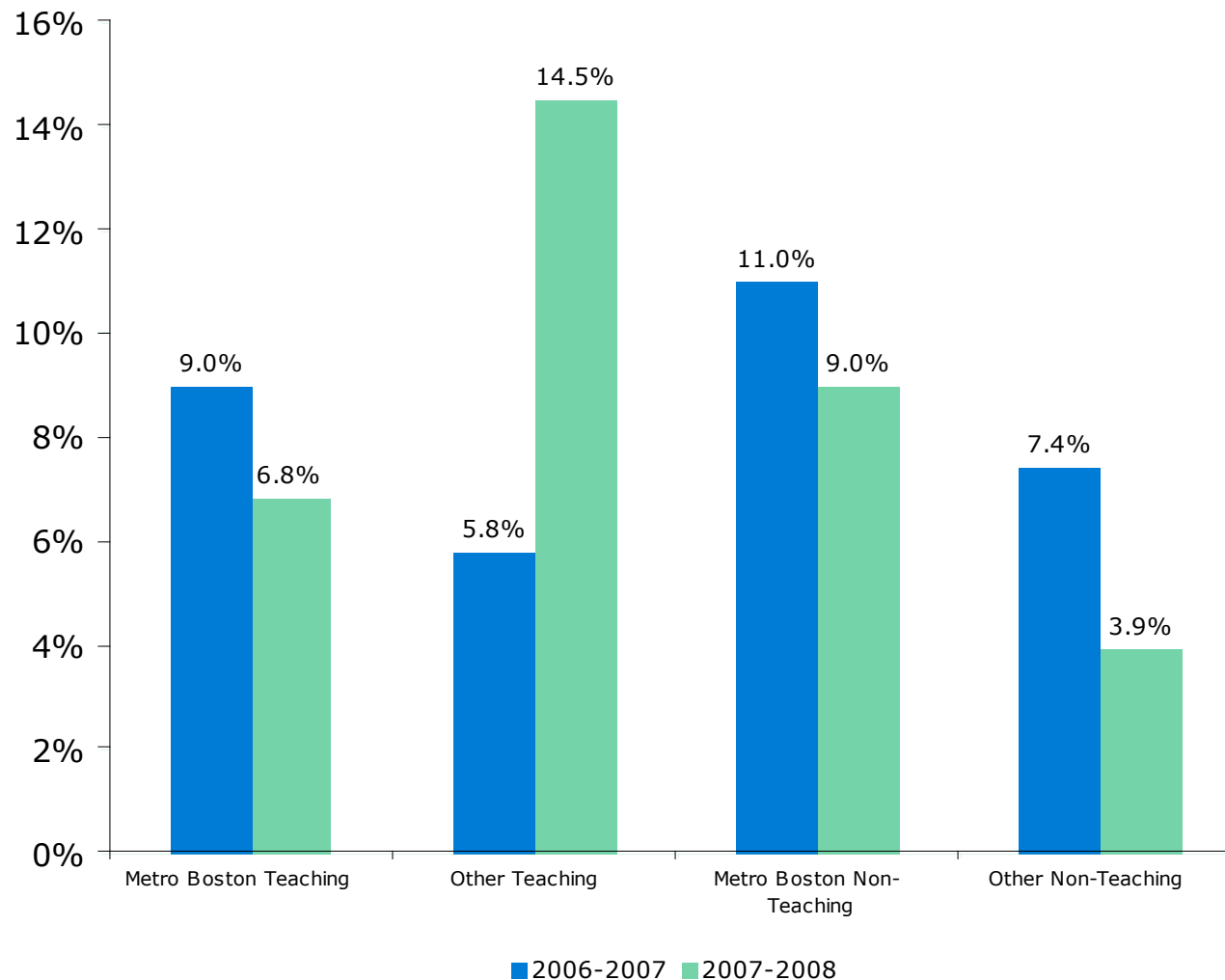


In 2008, teaching hospitals accounted for 64% of spending for inpatient care. Teaching hospitals had the highest expenditures for surgical DRGs, contributing to 70% of spending.



**Notes:** Data only include facility charges for care provided at acute inpatient facilities. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Expenditures for out-of-state hospitals are excluded, as are expenditures for a small number of in-state facilities for which either location or teaching status was unidentified. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

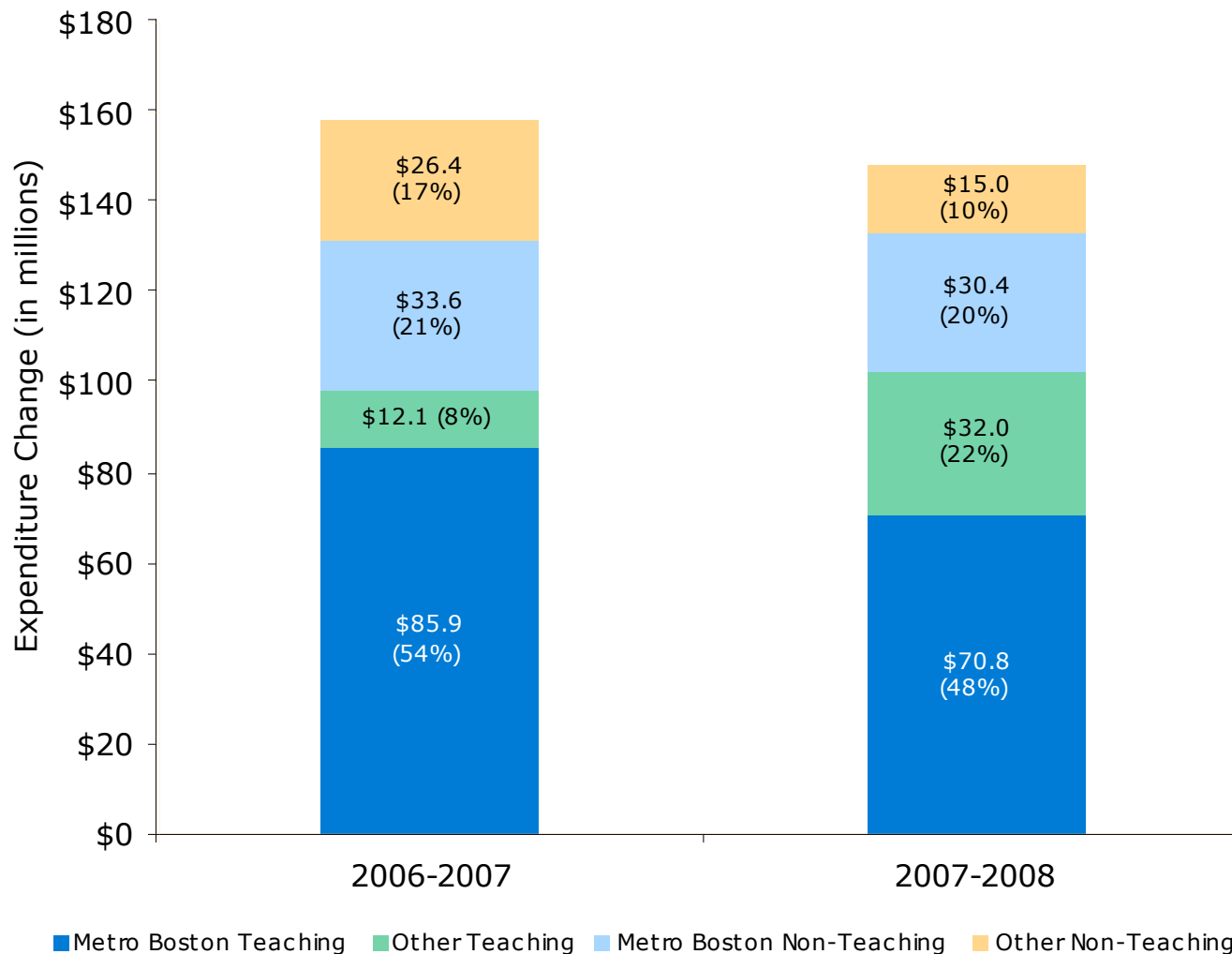
# Annual Change in Hospital Inpatient Expenditures by Teaching Status



In 2007-2008, spending for inpatient care in non-Boston teaching hospitals grew 15%, substantially more than the growth of spending in either teaching hospitals (7%) or non-teaching hospitals (9%) in the Boston area. Spending for inpatient care in non-teaching hospitals outside the Boston area grew less than 4%.

Within the metro-Boston area, non-teaching hospitals experienced somewhat faster growth in expenditures than did metro-Boston area teaching hospitals.

# Distribution of Changes in Hospital Inpatient Expenditures by Teaching Status



Teaching hospitals accounted for 70% of the growth in inpatient spending from 2007-2008, compared with 62% from 2006-2007. Boston-area teaching hospitals accounted for most of the growth each year (54% in 2006-2007 and 48% in 2007-2008).

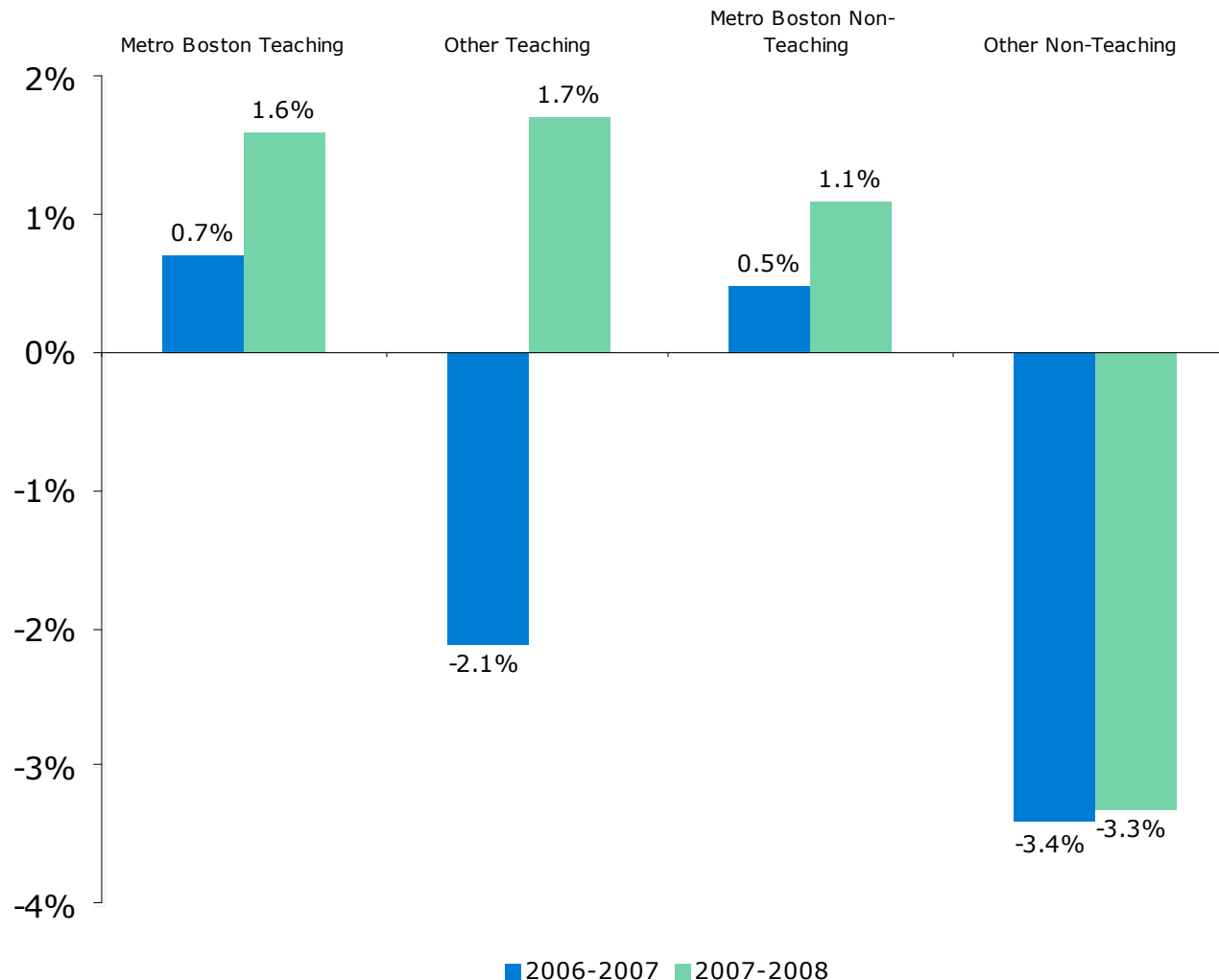
However, non-Boston teaching hospitals accounted for a larger proportion (22%) in 2007-2008 than in 2006-2007 (8%).



**Notes:** Data only include facility charges for care provided at acute inpatient facilities. Expenditures for out-of-state hospitals and a small number of in-state facilities where either location or teaching status was unidentified are not displayed. In total, 8% of increase in growth in 2006-2007 and 2% in 2007-2008 are missing due to unidentifiable teaching status. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.



# Annual Change in Hospital Inpatient Admission Rate by Teaching Status



From 2006-2007, the hospital admission rates outside the Boston area declined (-2.1% for teaching and -3.4% for non-teaching hospitals), while admission rates in Boston area hospitals remained about the same.

However, from 2007-2008, the admission rate for teaching hospitals (both in and outside the Boston area) increased 1.6% and 1.7%. Admission rates for non-teaching hospitals increased 1% in the Boston area and declined by 3.3% outside the Boston area.



**Notes:** Data include facility charges only for care provided at acute inpatient facilities. Out-of-state hospitals are excluded. A small number of in-state facilities are omitted, for which either location or teaching status was unidentified. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions was adjusted for missing data in 2007 and 2008; see methods appendix for details.

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## 3. Outpatient Facility Expenditures

Outpatient facility expenditures include both hospital based outpatient services as well as free-standing facilities. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the free-standing category.

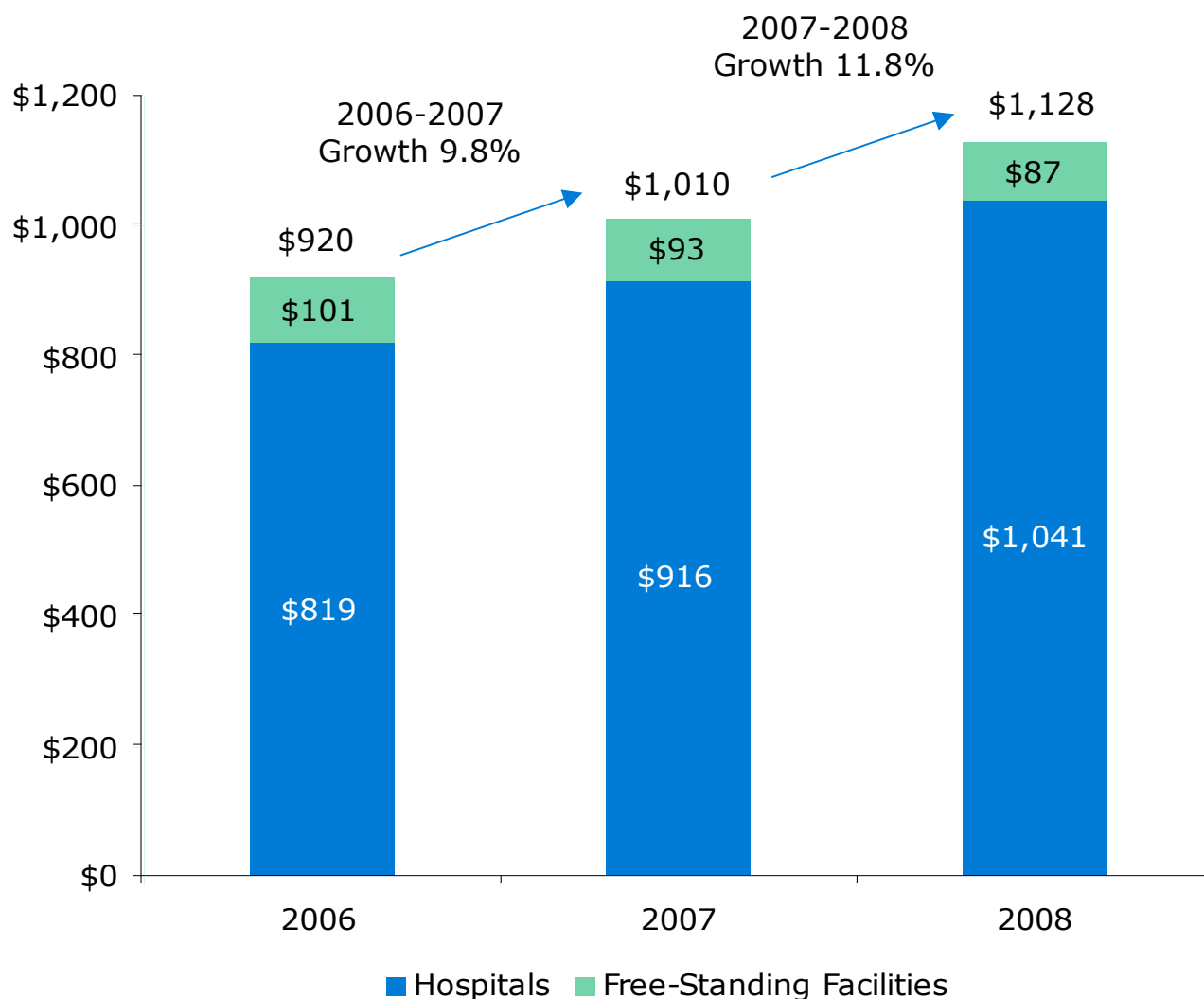
# 3.1 Spending Growth for Outpatient Facility Services, 2006-2008

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## Findings:

- In Massachusetts, acute care hospitals (versus freestanding facilities) provide most of the outpatient facility care and also accounted for all of the outpatient facility spending growth from 2006 to 2008.
- Although outpatient services spending per member increased by 9.8 to 11.8% each year between 2006 and 2008, spending for hospital-based outpatient services (which make up the bulk of outpatient facility spending) increased 11.9 to 13.7% while spending for free-standing outpatient facilities decreased 7% each year.
- Spending for procedures and imaging services accounted for more than half of the outpatient expenditures and was also a major contributor to the outpatient spending growth from 2006 to 2008.
- Digital mammography accounted for the largest share of growth in hospital outpatient expenditures between 2007 and 2008 (\$14.8m). The largest share of growth in free-standing facility expenditures was for upper GI endoscopy (\$1.4m).

# Privately Insured Outpatient Facility Expenditures per Member per Year and Annual Growth



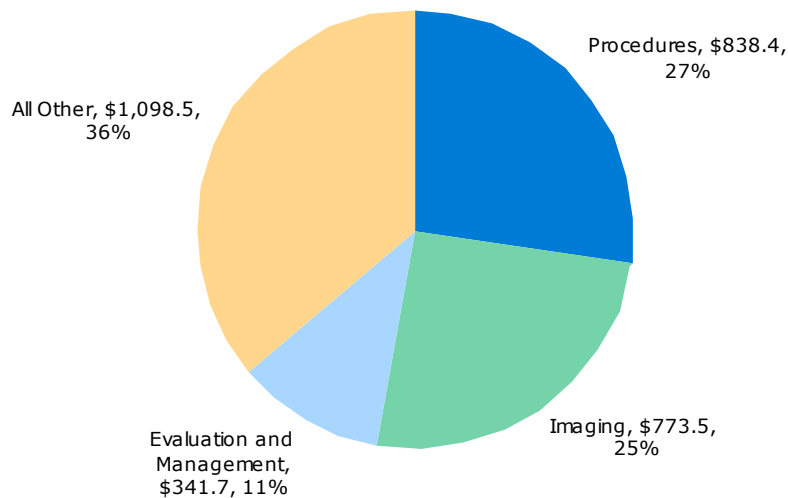
In Massachusetts, acute care hospitals (versus freestanding facilities) provided most outpatient facility care.

In both 2007 and 2008, per member spending for outpatient care grew faster than spending for inpatient care.

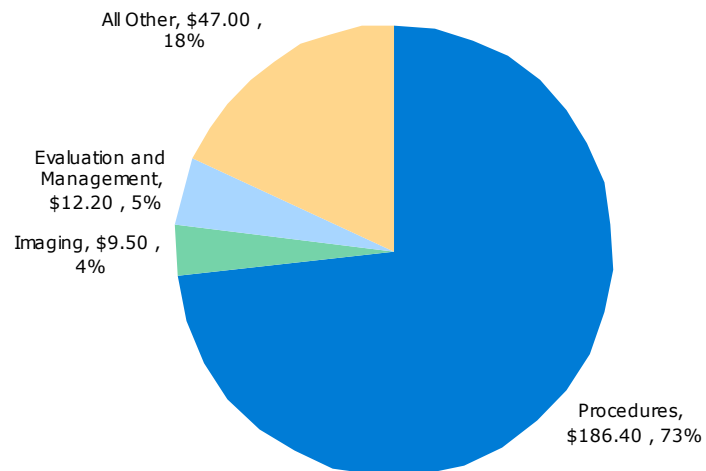
Outpatient hospital care accounted for all of this growth, as spending for care in freestanding facilities declined.

**Notes:** Data include only facility charges for outpatient care. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

# Distribution of Outpatient Expenditures by Service and Facility Type, 2008



Hospitals  
\$3,052.2 Million



Free-Standing Facilities  
\$255.1 Million

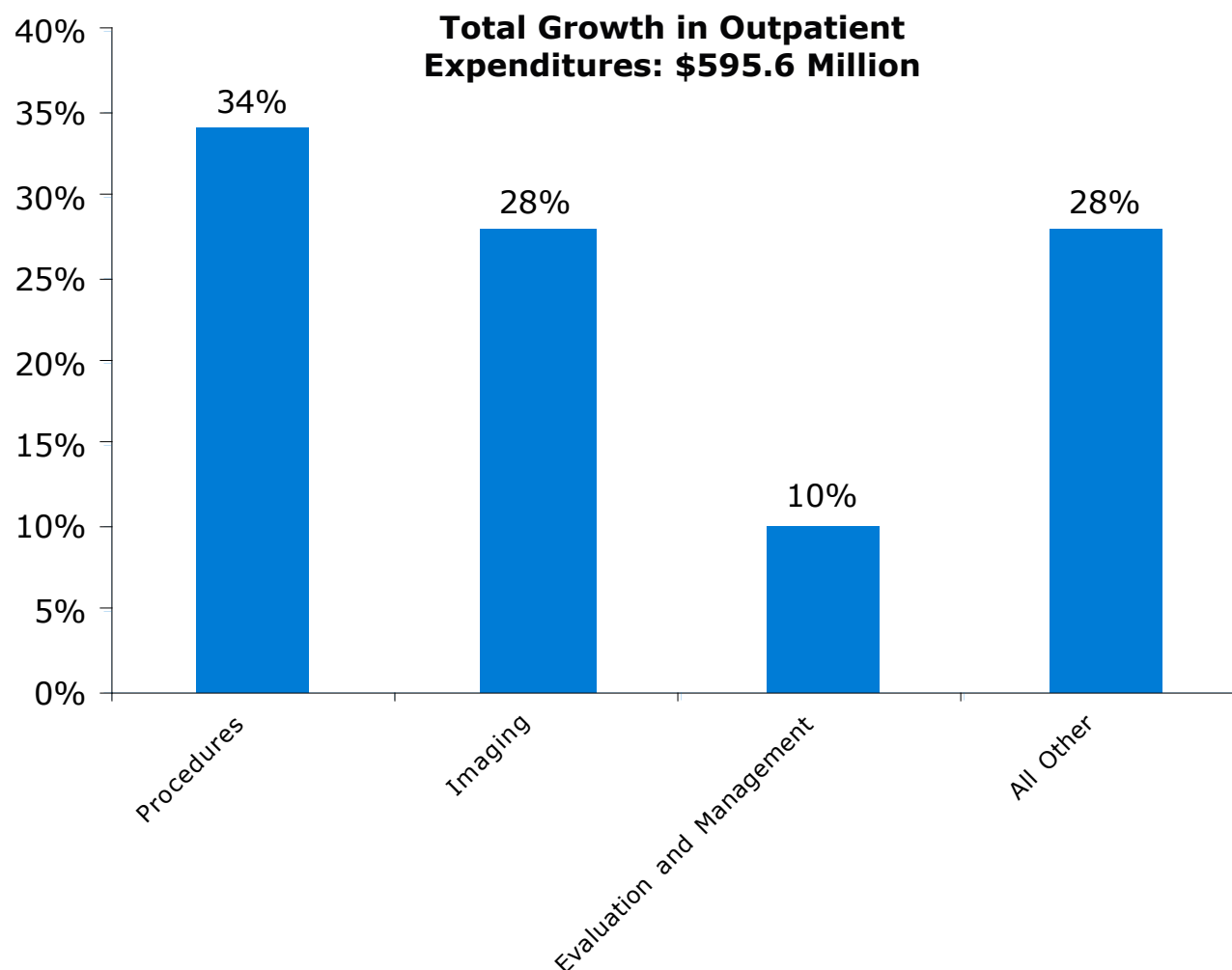
Procedures and imaging services together accounted for more than half of all spending for outpatient care.

Procedures accounted for 27% of spending for hospital outpatient care, but for 73% of outpatient spending for services from freestanding facilities.

Imaging services accounted for one-quarter of the spending in hospital outpatient settings while they accounted for 4% of spending in free-standing facilities.

**Notes:** Data include expenditures for outpatient care that are billed by the facilities (hospital and free-standing). Type of service is categorized with the BETOS grouper, using the CPT procedure codes on each claim. Procedures primarily include outpatient surgical procedures such as colonoscopies and arthroscopies that are billed by the facility. Evaluation and management services are typically urgent and non-urgent office visits that are billed by the facility. Lab and other tests, durable medical equipment, other outpatient services, and claims without a CPT code are included in the "all other" category. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

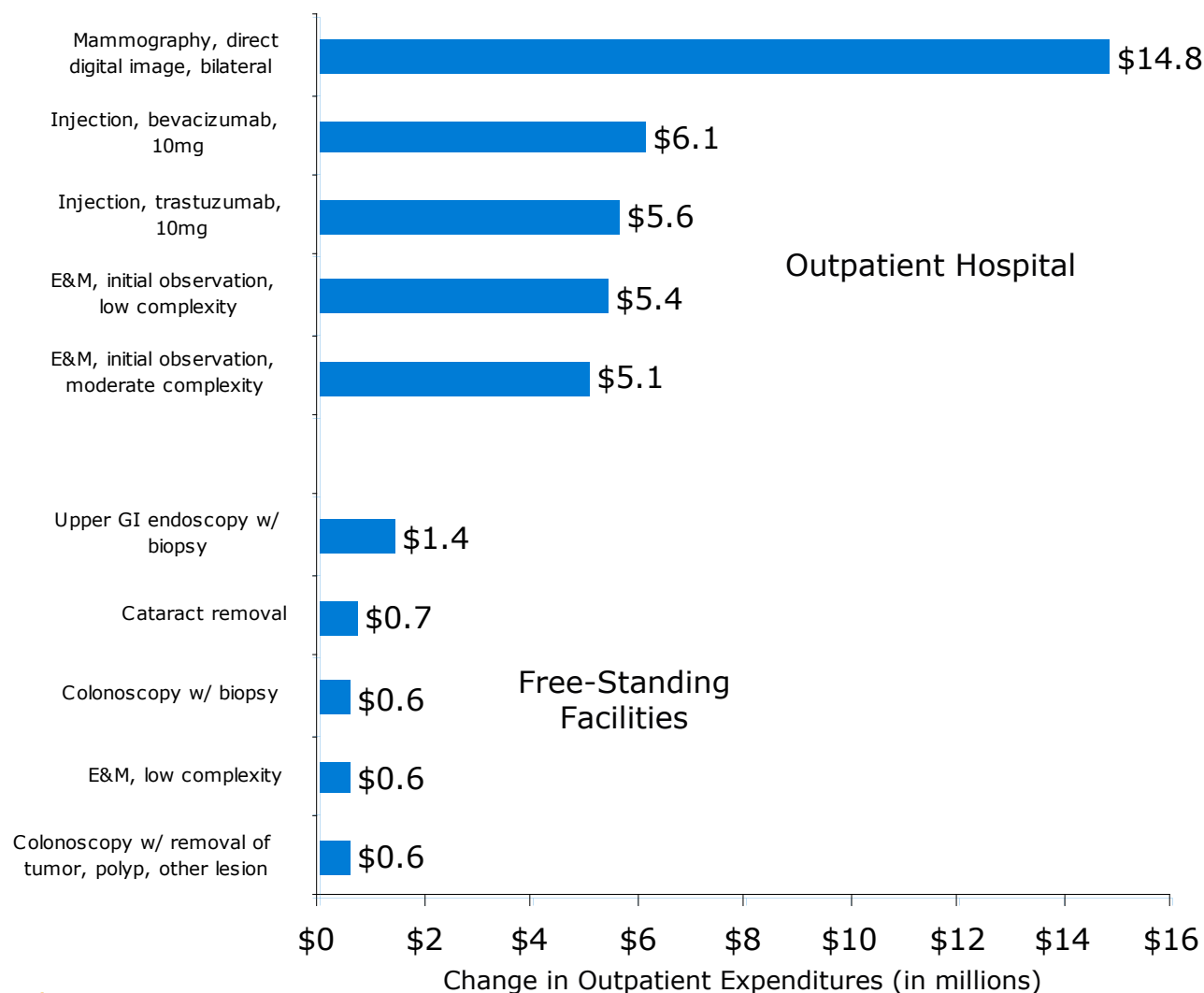
# Contribution of Service Types to the Growth of Outpatient Facility Expenditures, 2006-2008



Of the nearly \$600 million in spending growth for outpatient facility services from 2006 to 2008, spending for procedures grew by more than \$200 million (contributing 34% to total expenditure growth). Imaging also significantly contributed to total expenditure growth, growing \$165 million from 2006 to 2008, representing 28% of total growth.

**Notes:** Data include expenditures for outpatient care that are billed by the facilities (hospital and free-standing). Type of service is categorized with the BETOS grouper, using the CPT procedure codes on each claim. Procedures primarily include outpatient facility charges associated with surgical procedures such as colonoscopies and arthroscopies that are billed by the facility. Evaluation and management services are typically urgent and non-urgent office visits that are billed by the facility. Lab and other tests, durable medical equipment, other outpatient services, and claims without a CPT code are included in the "all other" category. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

# Selected Services Accounting for the Largest Growth in Outpatient Expenditures, 2007-2008



Bilateral mammography, growing \$14.8 million between 2007 and 2008, accounted for the largest growth in outpatient hospital expenditures.

For free-standing facilities, no single service accounted for a large proportion of growth although upper GI endoscopy showed the largest growth (\$1.4 million) among all services.

**Notes:** Data include facility charges only for outpatient care. Certain claims (representing 20 percent of total outpatient expenditures in 2008) are excluded. See the methods appendix for additional details.

## 3.2 Outpatient Facility Expenditures: Price Versus Volume, 2006-2008

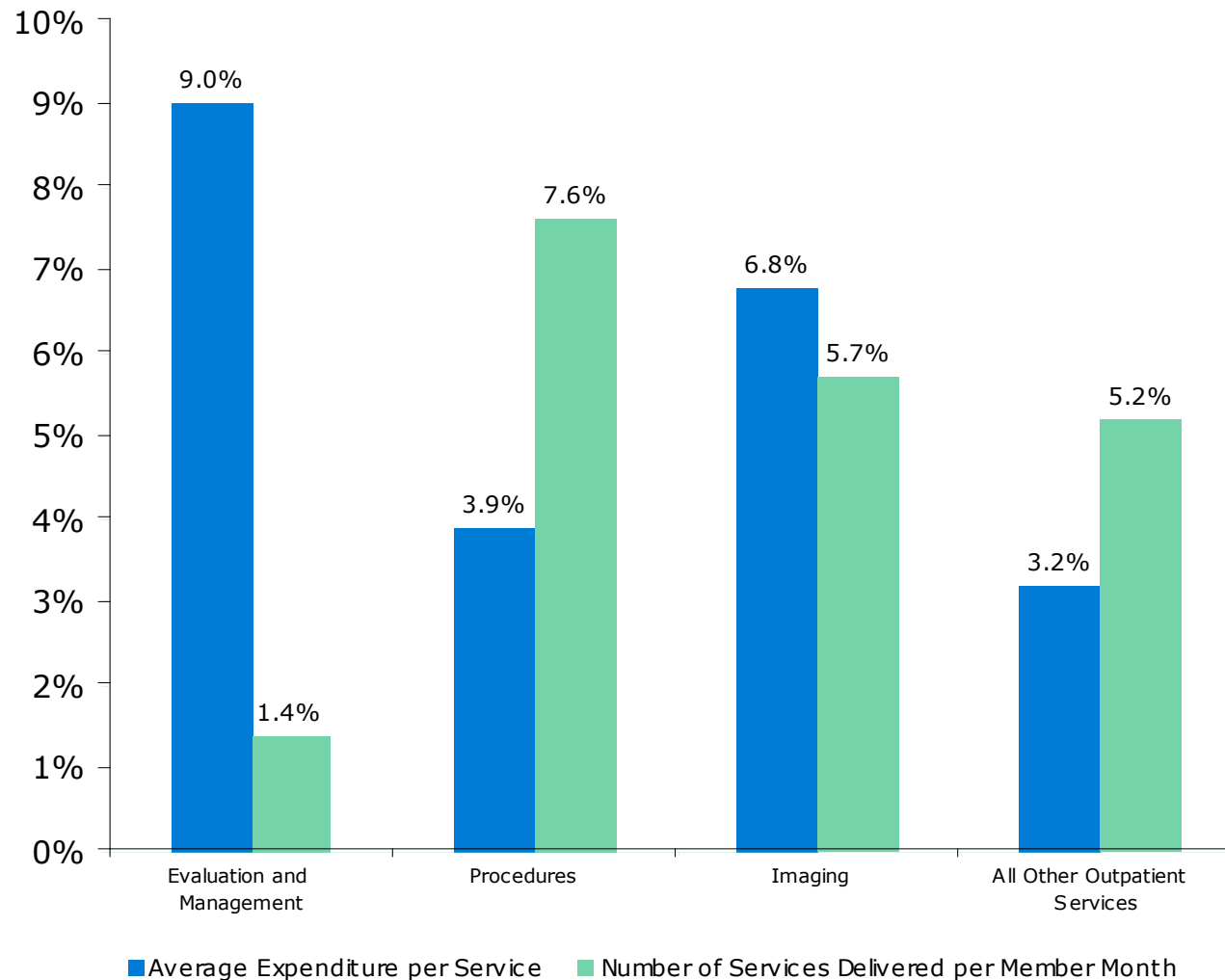
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### Findings:

- Both price and volume contributed to the growth in spending for outpatient facility care from 2006 to 2008.
- Expenditures per service grew much faster than the volume of services in 2007, but this pattern reversed in 2008.
- From 2006 to 2008, expenditures per service grew faster for evaluation and management services (office visits) than for any other outpatient category, while the number of office visits delivered grew significantly less than other outpatient categories.
- There is a great deal of price variation within both hospital outpatient and free-standing facility settings. The highest prices paid were often more than double the average price paid and exceeded the lowest prices paid by as much as ten times or more for some procedures.



# Annual Growth in Outpatient Expenditure per Service and Volume per Member by Type of Service, 2006-2008



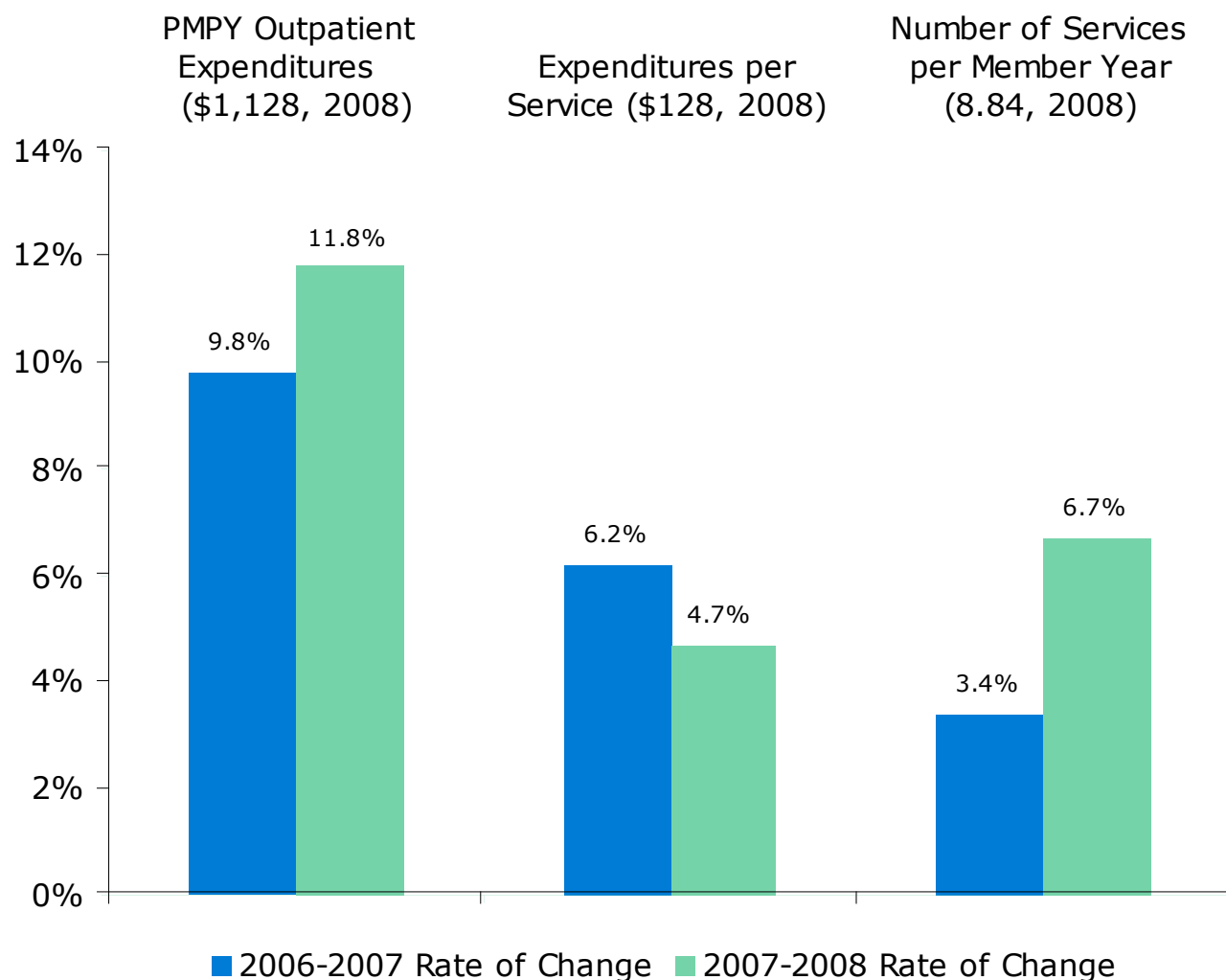
From 2006 to 2008, spending per service increased 9% per year for evaluation and management visits while the number of visits remained relatively flat.

Both price and volume increased substantially for imaging services (7% and 6% per year, respectively).

Volume was a stronger driver of expenditure growth for procedures and other outpatient services.

**Notes:** Data include expenditures for outpatient care that are billed by the facilities (hospital and free-standing). Type of service is categorized with the BETOS grouper, using the CPT procedure codes on each claim. Procedures primarily include outpatient services associated with surgical procedures such as colonoscopies and arthroscopies that are billed by the facility. Evaluation and management services are typically urgent and non-urgent office visits that are billed by the facility. Lab and other tests, durable medical equipment, other outpatient services, and claims without a CPT code are included in the "all other" category. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

# Change in Outpatient Facility Expenditures per Member per Year, 2006-2008



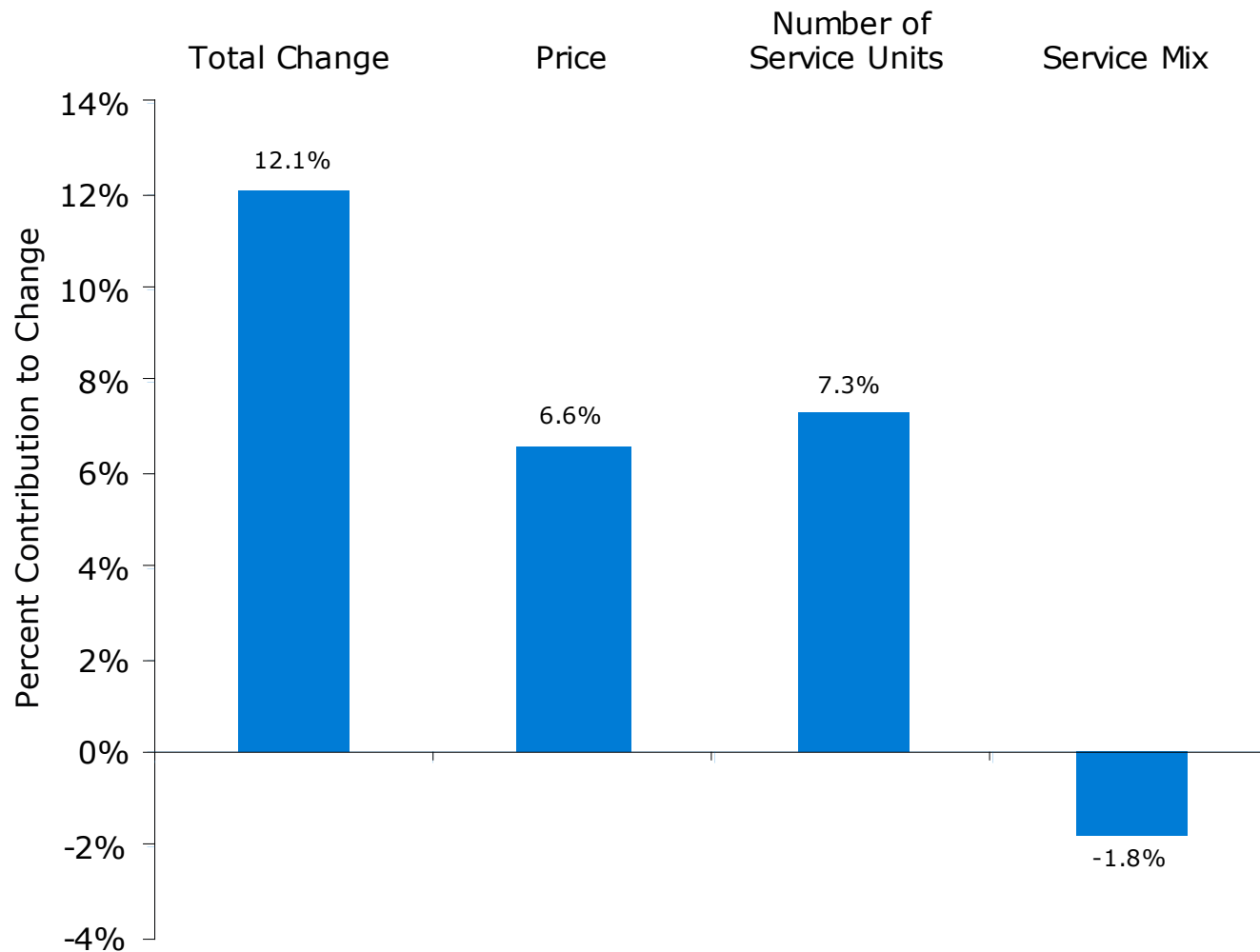
In 2006-2007 and 2007-2008, both the average spending per service and the number of services used per member contributed to higher spending for outpatient care.

In 2006-2007, spending per service increased twice as fast (6%) as the number of services (3%). This pattern reversed in 2007-2008, as the spending per service grew more slowly (5%) but the number of services provided accelerated (7%).

Note: Expenditures per service is calculated as the sum of expenditures divided by the number of services and can be considered a proxy for price. However, we recognize that average expenditures are affected by shifts in the mix of services to higher or lower priced services. The next slide provides a price measure that controls for that shift in service mix and represents a more accurate measure of changes in actual unit prices.

**Notes:** Data include expenditures for outpatient care that are billed by the facilities. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data. The number of services was adjusted for missing data in 2007 and 2008. See the methods appendix for additional details.

# Drivers of Change in Outpatient Service Expenditures (Price v. Volume), 2006-2007

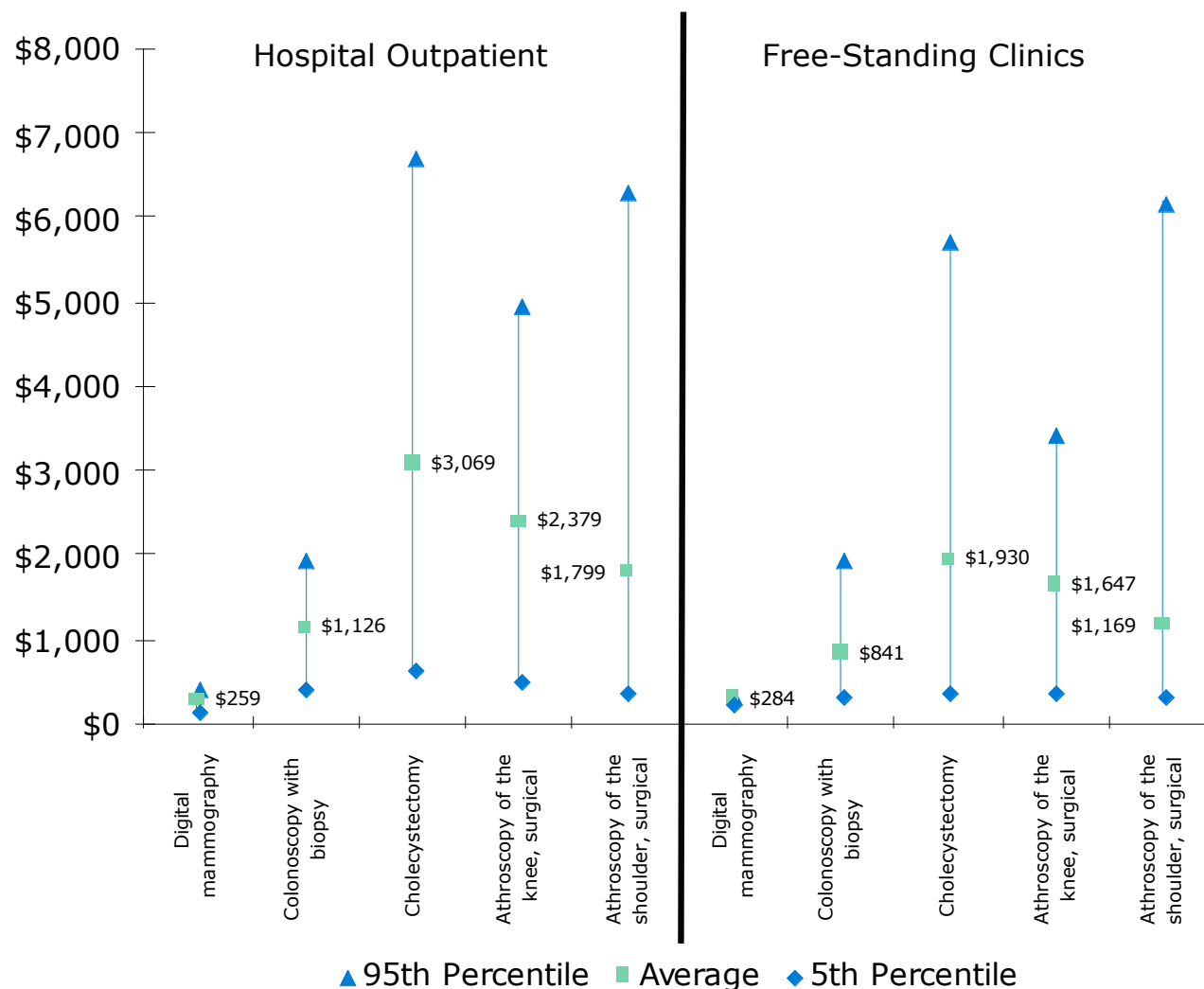


In 2006-2007, increasing prices (6.6%) and a greater volume of services (7.3%) drove outpatient expenditure growth, while service mix showed negative growth during the same time period (-1.8%).

Note: To more accurately measure unit price changes, it is important to isolate price versus volume and service mix changes. To do this, we constructed a market basket that included services that occurred consistently in the years of comparison. We then decomposed its component parts: change due to price while holding utilization constant, and change due to volume while holding price constant and the remaining change due to service mix (a shift to higher or lower cost services). We are unable to control for shifting to higher cost settings. That effect is captured in the price component. For this decomposition analysis only the change from 2006 to 2007 is available. (see technical appendix in full report).

**Notes:** The number of service units corresponds to the number of times the service or procedure billed for was performed; one claim may include multiple service units. (For example, injectable drugs are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) A change in the number of service units may reflect change in the number of insured member months as well as the number of service units pmpm.

# Price Variation for Selected High-Frequency Outpatient Services by Outpatient Facility, 2008



Price variation in both the hospital outpatient setting and the free standing clinics was wide. For example, the highest price paid (95<sup>th</sup> percentile) for arthroscopic knee surgery was more than double the average price paid in both the hospital outpatient setting and free-standing clinic. This holds true for most services with the exception of mammography.



**Notes:** CPT codes are used for grouping the procedures. Data include only facility charges. Percentiles are calculated and compared by carrier; the highest 95th percentile and the lowest 5th percentile are presented, together with average price across all carriers. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category.

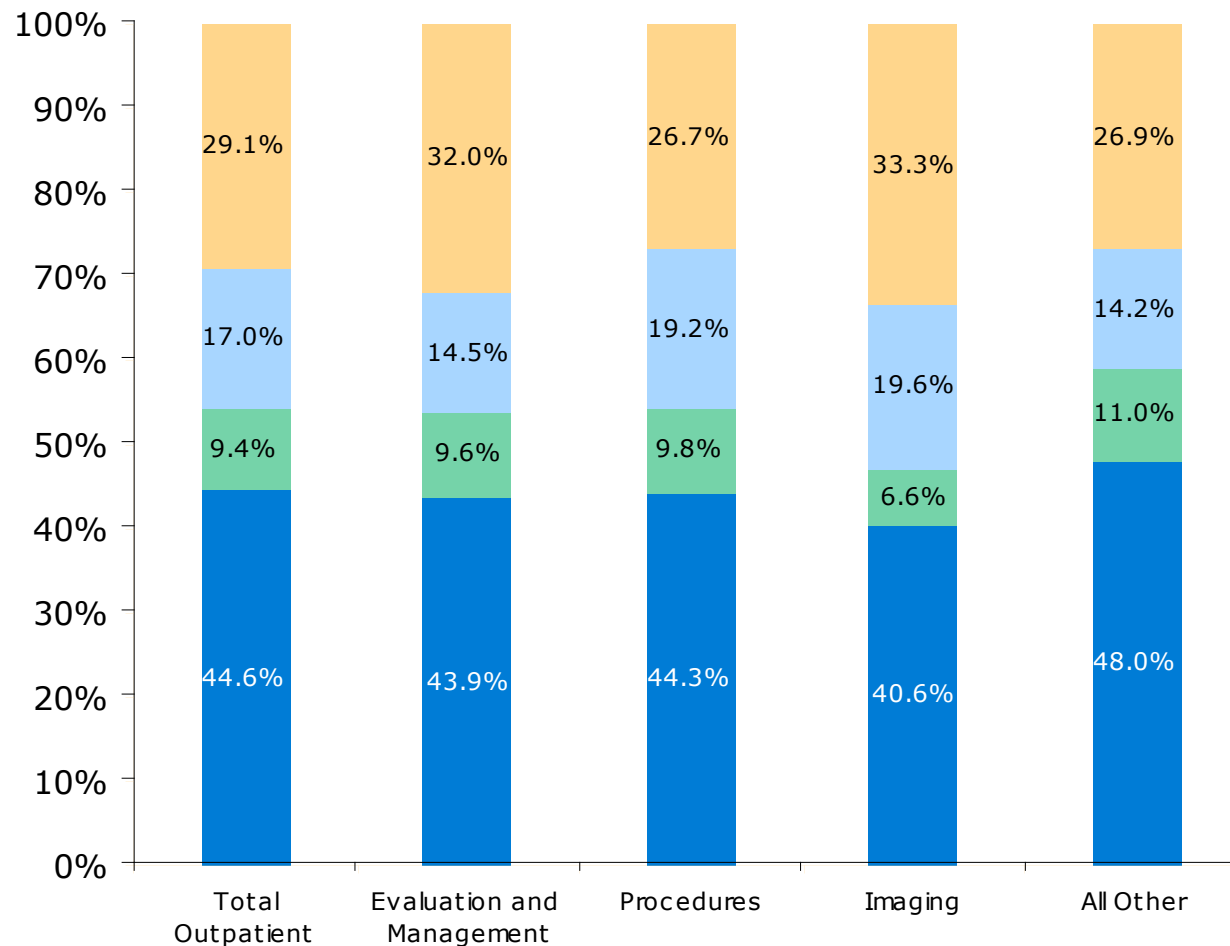
## 3.3 Hospital Outpatient Expenditure Growth for Teaching versus Non-Teaching Hospitals, 2006-2008

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### Findings:

- Teaching hospitals accounted for more than half of hospital outpatient spending in 2008 and contributed to more than half of the growth in hospital outpatient expenditures in both 2006-2007 and 2007-2008.
- Boston-area non-teaching hospitals accounted for a much larger share of expenditure growth from 2007 to 2008 (16%) than they did in 2006-2007 (11%).
- The volume of hospital outpatient services increased more in teaching hospital than in non-teaching hospitals from 2006-2007 and increased more in 2008 than in 2007 across all hospitals with the most significant increase (10%) occurring for metro-Boston non-teaching hospitals.

# Distribution of Hospital Outpatient Expenditures by Teaching Status, 2008



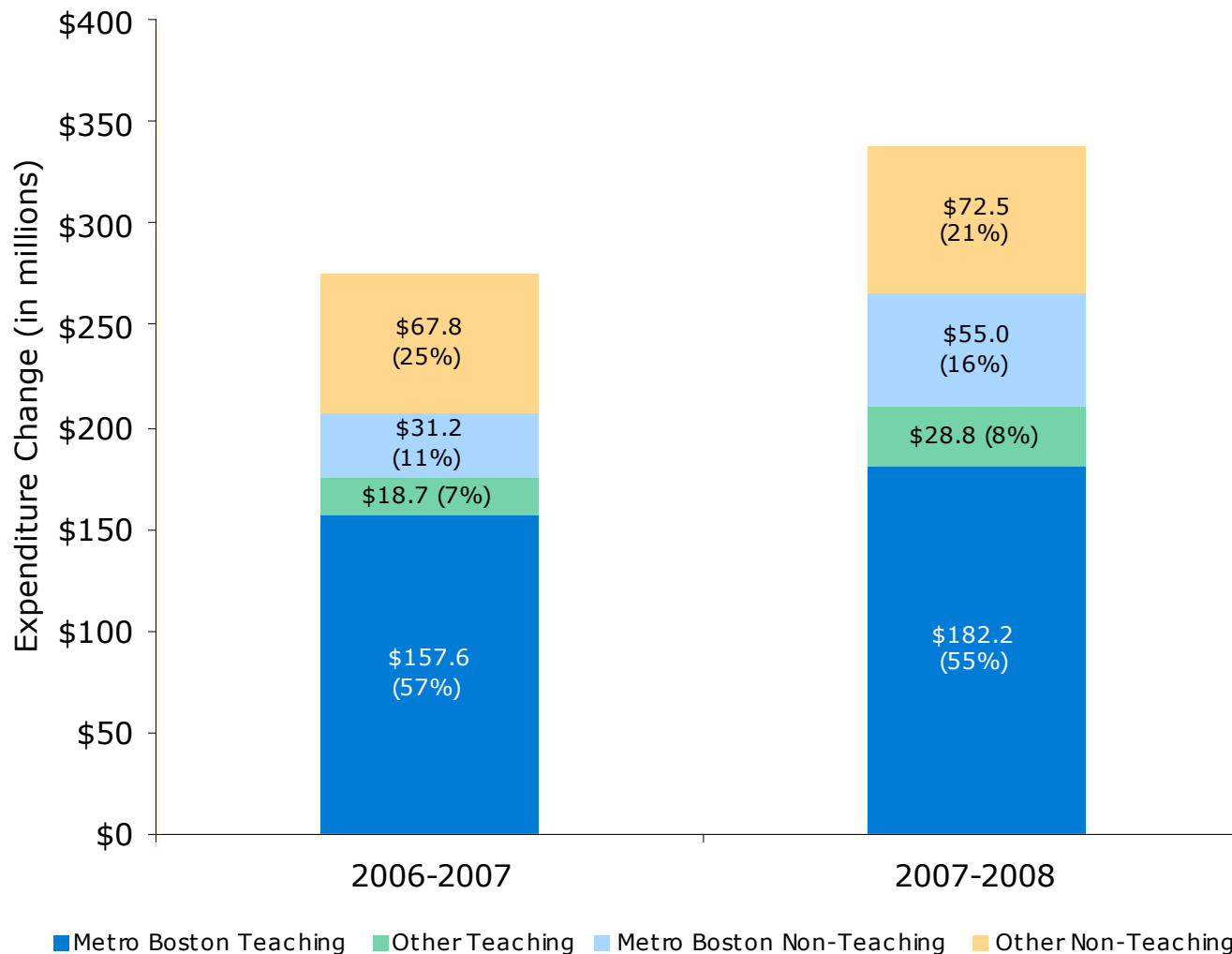
In 2008, teaching hospitals provided more than half (54%) of total outpatient spending. Most of this spending (45%) was for care obtained in Boston-area teaching hospitals.

Imaging made up a larger share of expenditures (52.9%) in non-teaching hospitals compared to other service categories.

■ Metro Boston Teaching ■ Other Teaching ■ Metro Boston Non-Teaching ■ Other Non-Teaching

**Notes:** Data include expenditures for outpatient care that are billed by the hospital. Type of service is categorized with the BETOS grouper, using the CPT procedure codes on each claim. Procedures primarily include outpatient services associated with surgical procedures such as colonoscopies and arthroscopies that are billed by the hospital. Evaluation and management services are typically urgent and non-urgent office visits that are billed by the hospital. Lab and other tests, durable medical equipment, other outpatient services, and claims without a CPT code are included in the "all other" category. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

# Distribution of Changes in Hospital Outpatient Expenditures by Teaching Status

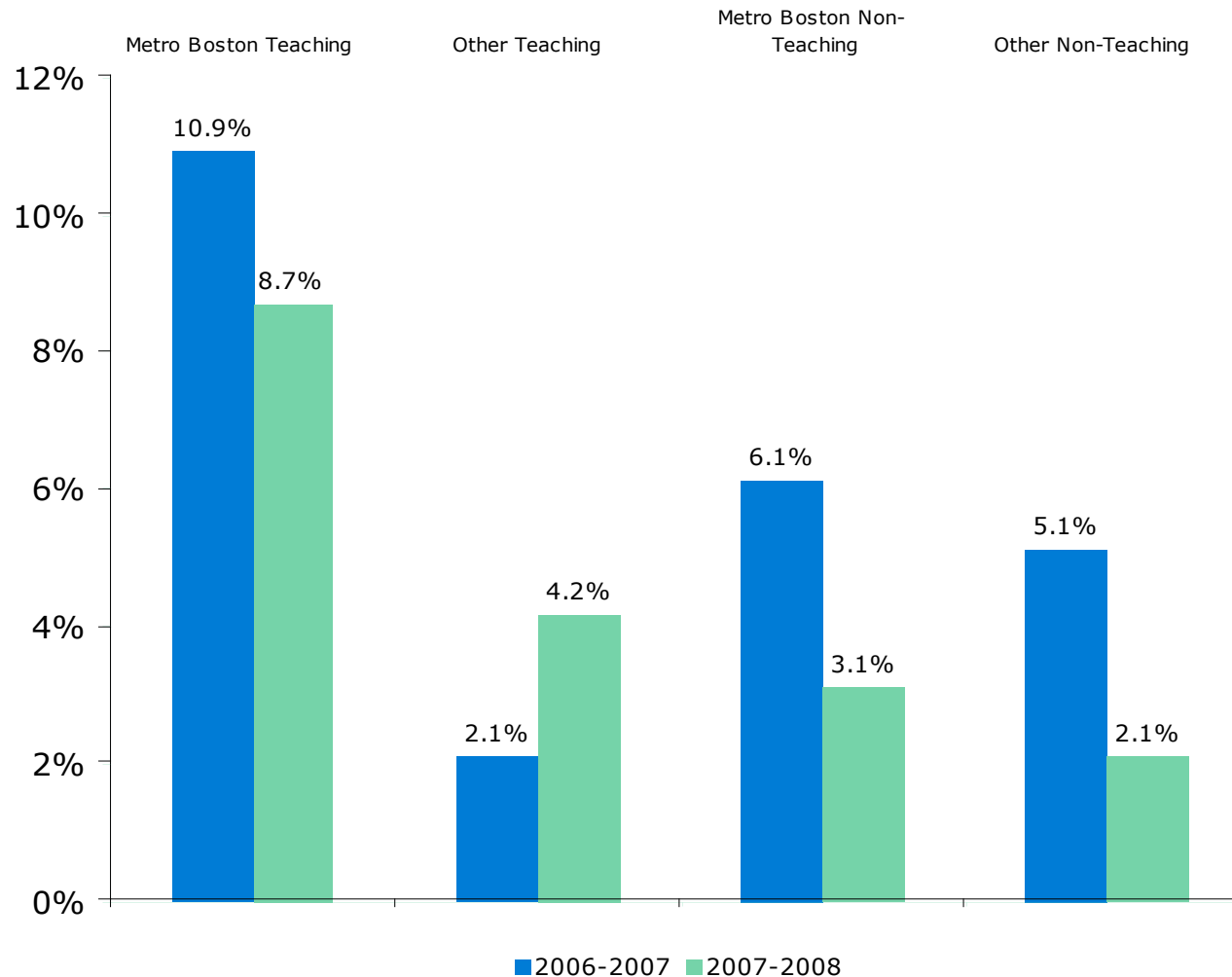


While Boston area teaching hospitals accounted for more than half of the change in hospital outpatient expenditures in both 2006-2007 and 2007-2008, Boston-area non-teaching hospitals accounted for a much larger share of expenditure growth in 2007-2008 (16%) than in 2006-2007 (11%).



**Notes:** Data only include facility charges for care provided at acute inpatient facilities. Expenditures for out-of-state hospitals and a small number of in-state facilities where either location or teaching status was unidentified are not displayed. In total, 4% of increase in growth in both 2006-2007 and 2007-2008 are missing due to unidentifiable teaching status. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

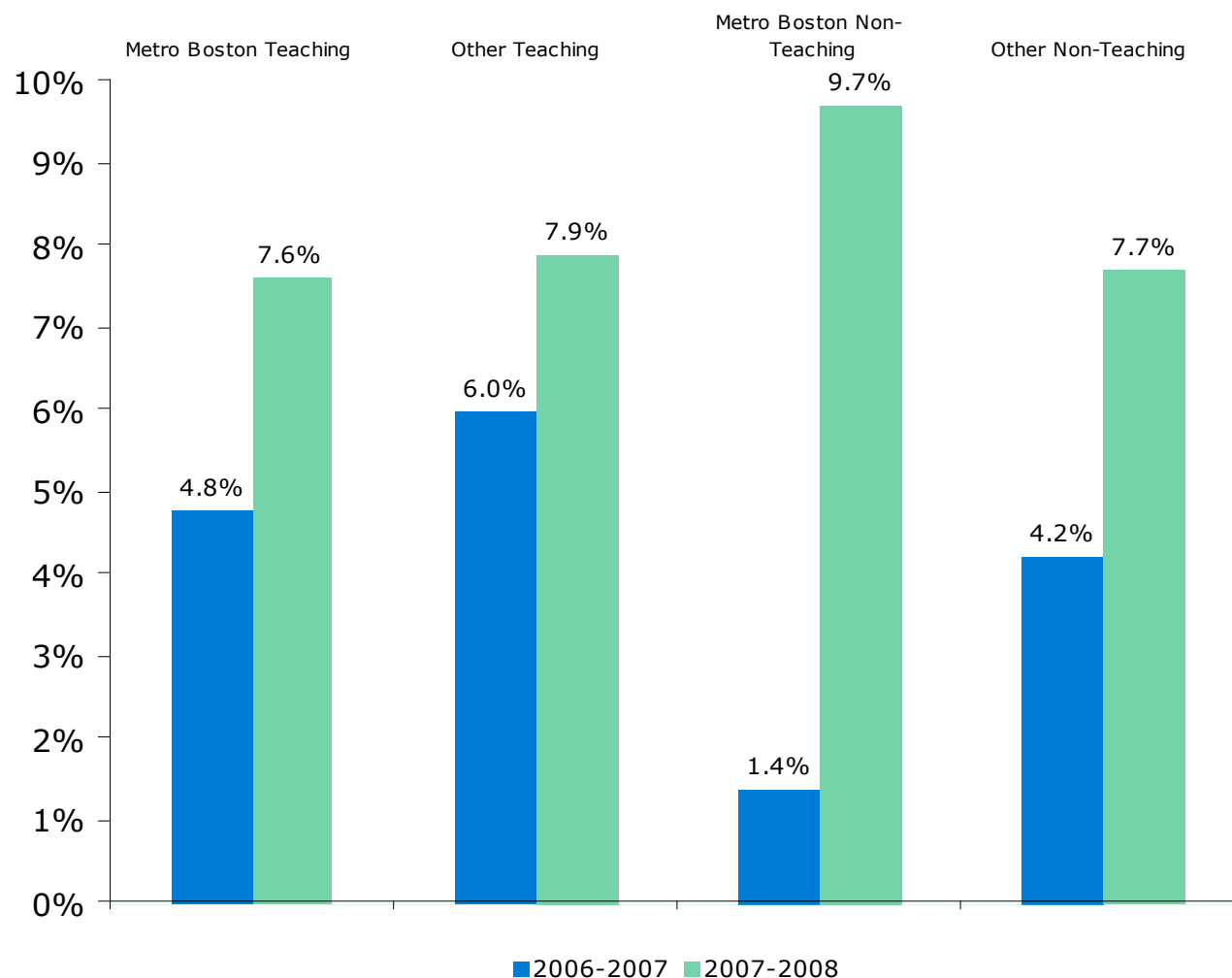
# Annual Change in Hospital Outpatient Expenditures per Service by Teaching Status



Hospital outpatient expenditures per service had the highest increase in metro Boston teaching hospitals in both years 2007 and 2008.



# Annual Change in Number of Hospital Outpatient Services per Member by Teaching Status



From 2006-2007, the number of hospital outpatient services per member increased more in teaching hospitals than in non-teaching hospitals. In 2007-2008, Boston area non-teaching hospitals showed the largest change in the number of hospital outpatient services, increasing by nearly 10%.

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## **4. Physician and Other Professional Services Expenditures**

Physician and other professional services include those services rendered by MD's, (primary care and specialists) as well as nurse practitioners, physician's assistants, chiropractors, physical/occupational therapists, psychologists, nurses, dentists, etc.

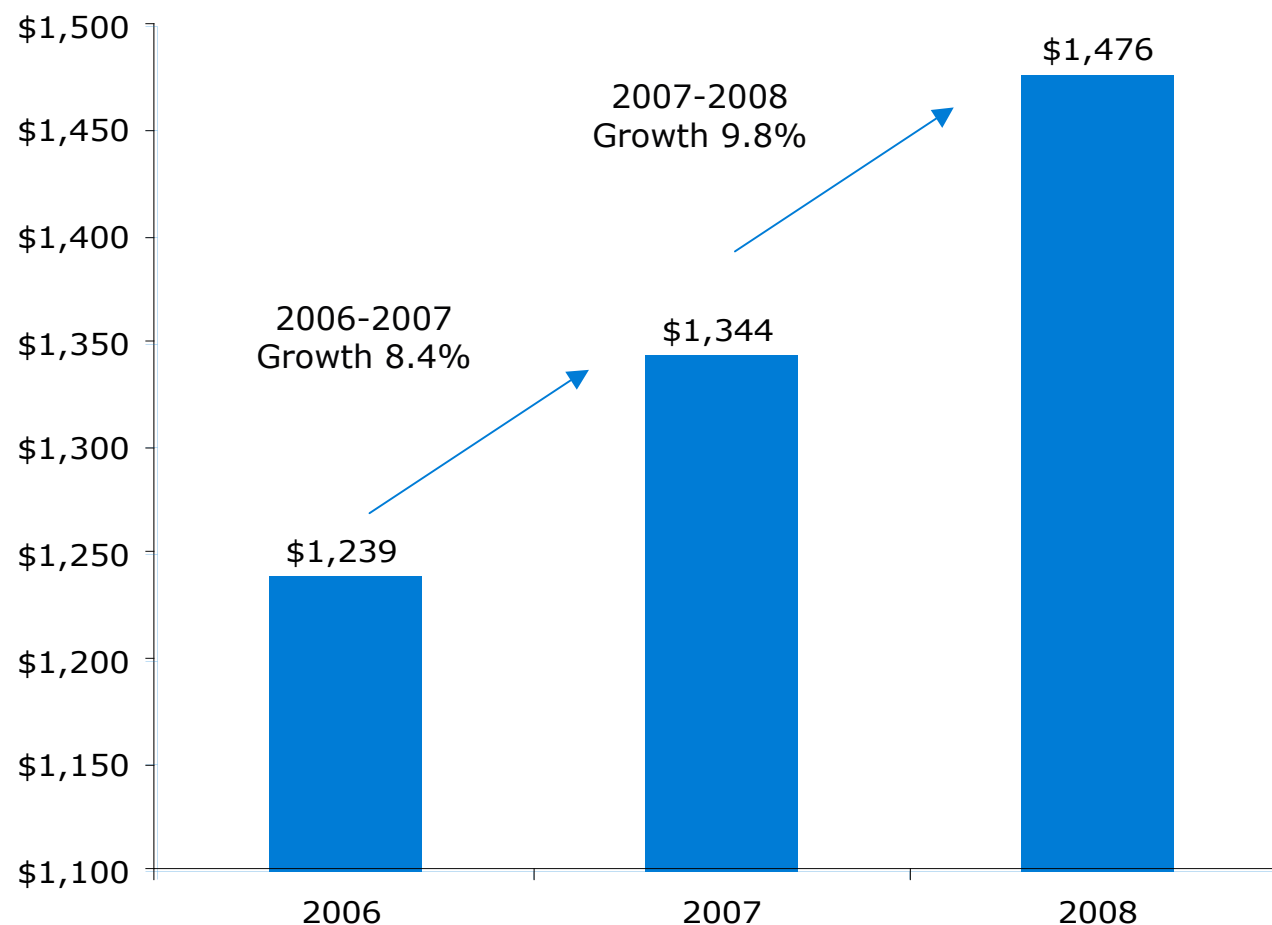
## 4.1 Spending Growth for Physician and Other Professional Services, 2006-2008

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### Findings:

- Per member spending for professional services (physicians and other health care professionals) increased 8.4% from 2006 to 2007 and 9.8% from 2007 to 2008. Nearly half of the growth in spending was due to specialist services.
- Although there was substantial increase in spending for all physician/professional categories in each time period, there was an acceleration in spending growth for specialists and, in particular, for other professionals, while the growth rate in spending for primary care services declined slightly.
- Evaluation and management services (office visits) accounted for the largest proportion of spending on physician/professional services in 2008 and accounted for the largest share of the growth from 2007 to 2008.
- Spending for psychotherapy services also accounted for a significant share of expenditure growth from 2007 to 2008.

# Privately Insured Physician/Professional Services per Member Expenditures and Annual Growth



Per member spending for physician/professional services grew 19.1% from 2006 to 2008. The rate of growth accelerated from 8.4% for 2006-2007 to 9.8% in 2007-2008.

The acceleration in the growth rate reflect accelerated growth in spending for specialists and other professionals while the growth rate in spending for primary care services declined.

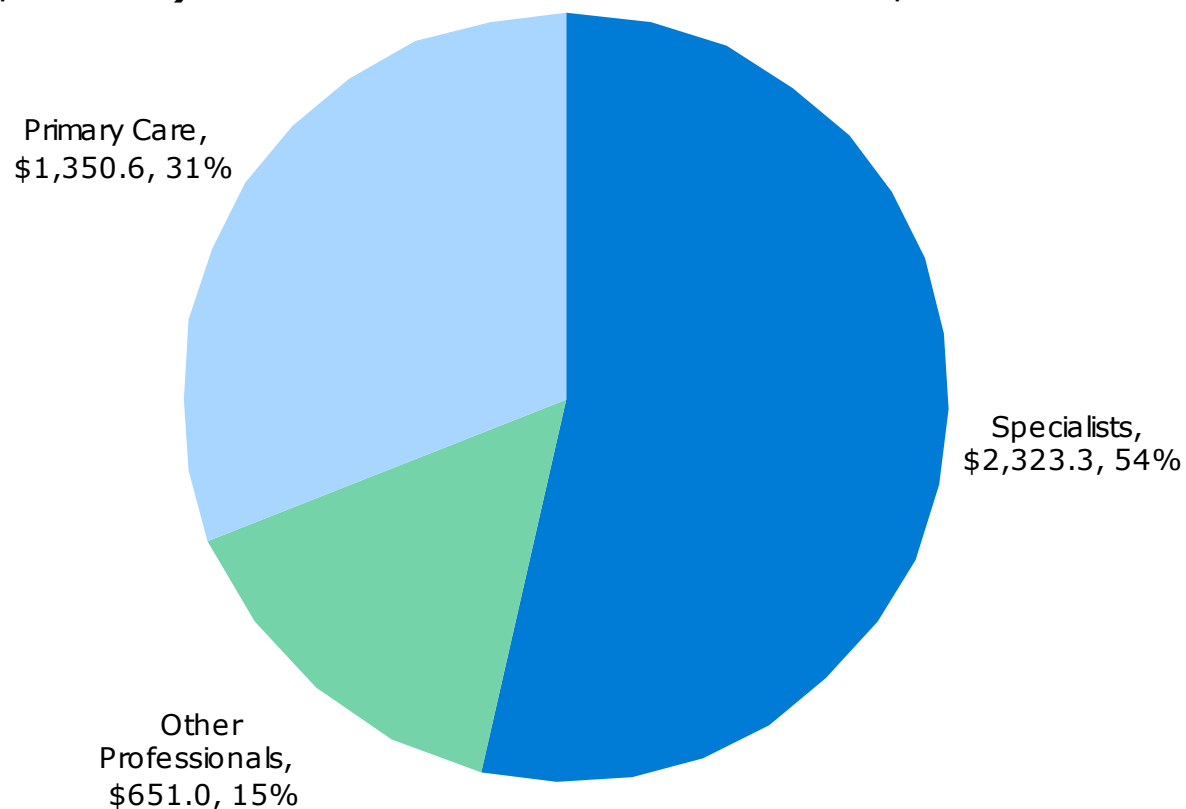


**Notes:** Data include professional charges only. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

# Privately Insured Physician/Professional Service Expenditures by Provider Type, 2008

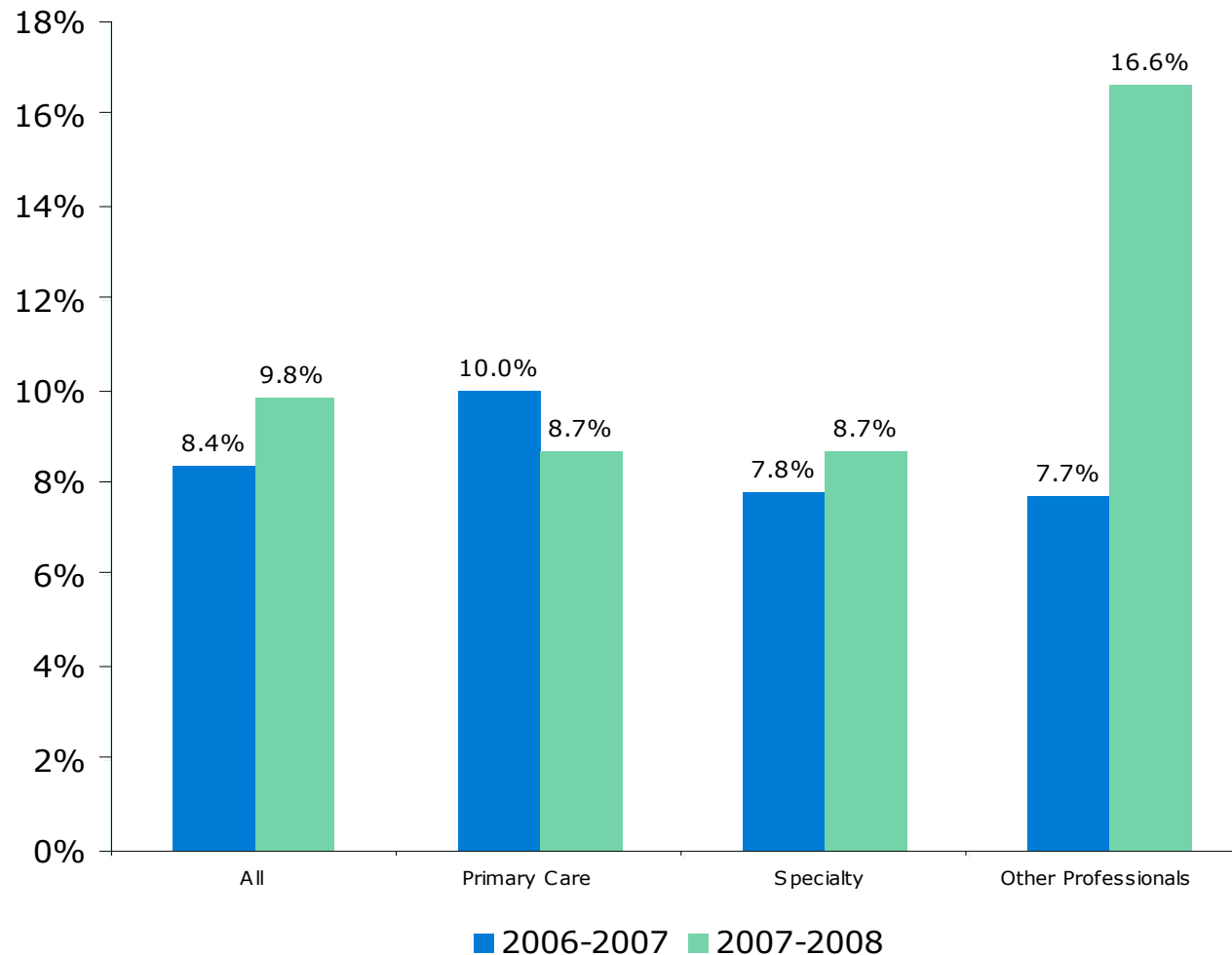
(\$ million)

Total: \$4.3 Billion



In 2008, physician/professional service expenditures totaled \$4.3 billion. More than half of all spending for professional services was for care provided by medical specialists (\$2.3 billion). Primary care providers made up 31% (\$1.3 billion) of physician/professional service expenditures. If not included in primary care, other professionals such as nurses, physician's assistants, dentists, and psychologists made up 15% (\$651 million) of professional service expenditures.

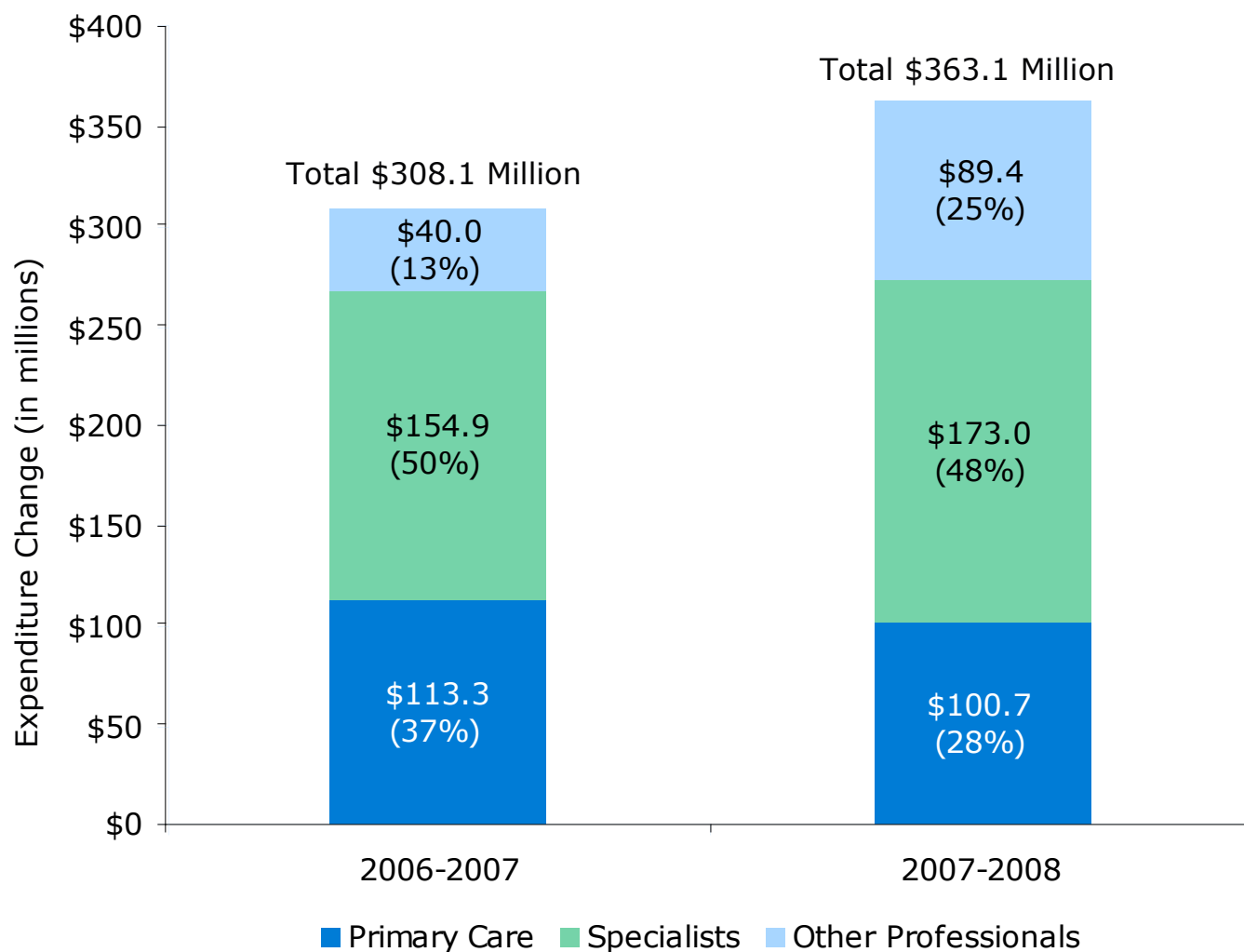
# Annual Growth in Physician/Professional Services per Member by Provider Type



Per member spending for primary care services increased 10% from 2006-2007 and another 9% from 2007-2008. Spending accelerated in 2008 by 16.6% for other professionals such as nurses, therapists, psychologists, and dentists.

**Notes:** Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists includes all other MDs. Other professionals include all other nurses, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, etc., as well as professional claims where the provider type is unknown. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Since services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. (Injectable drugs, among other services, are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of services provided. The number of services was adjusted for missing data in 2007 and 2008.

# Contribution of Provider Type to Annual Growth of Physician/Professional Expenditures



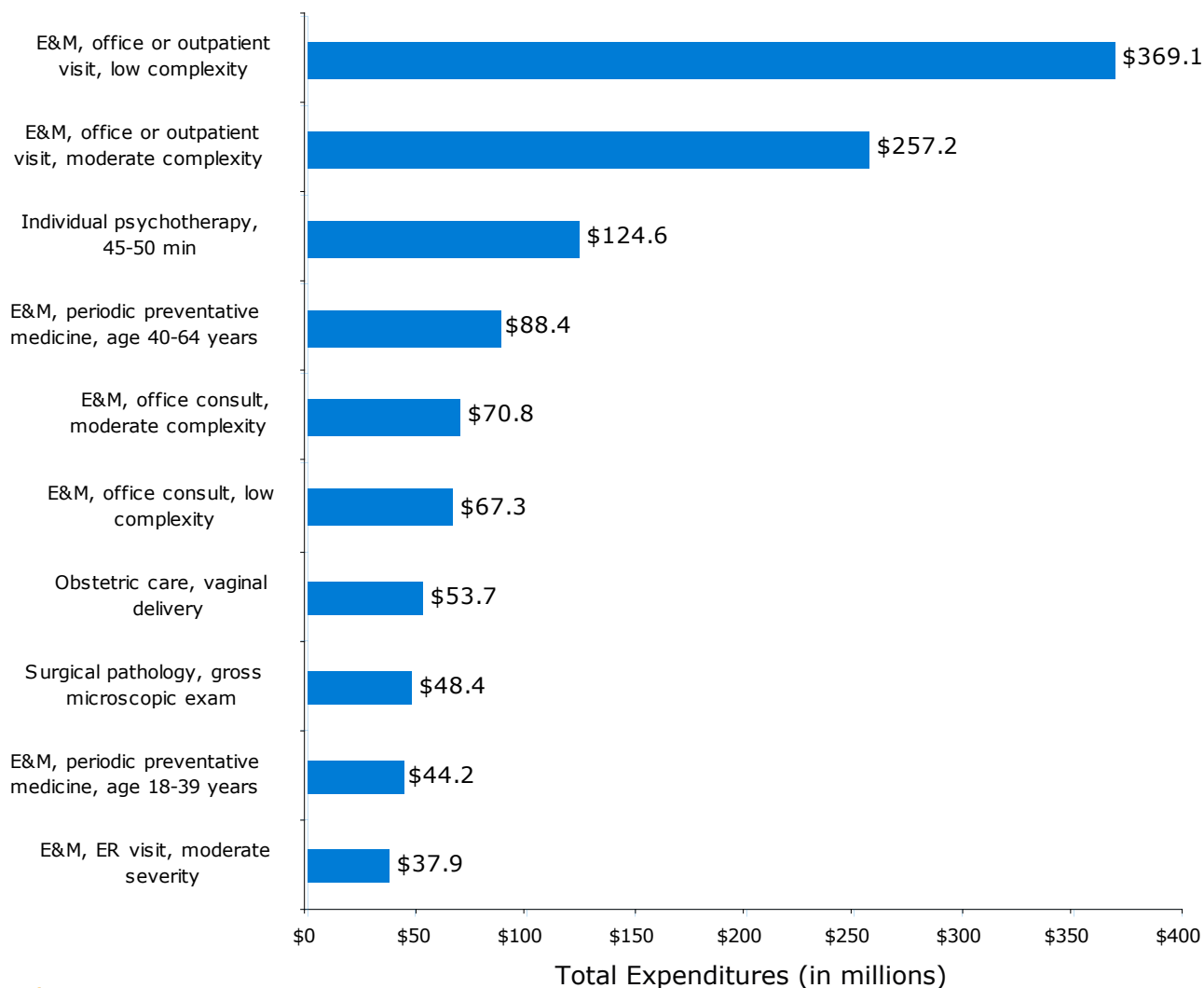
The annual growth of professional expenditures increased from \$308M in 2006-2007 to \$363M in 2007-2008, representing nearly 20% of all professional services.

Spending for specialists services grew \$173M from 2007 to 2008 accounting for the largest share of spending growth (48%).

The increase in spending for other professionals (such as nurses, psychologists, and, dentists) more than doubled in 2007 to 2008 compared to 2006 to 2007.

**Notes:** Data include professional charges only. Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists includes all other MDs. Other professionals include all other nurses, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, etc., as well as professional charges where the provider type is unknown. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

# Selected Services Accounting for the Highest Physician/Professional Expenditures, 2008



In 2008, total spending for the seven highest-expenditure evaluation and management services totaled \$934.9 million.

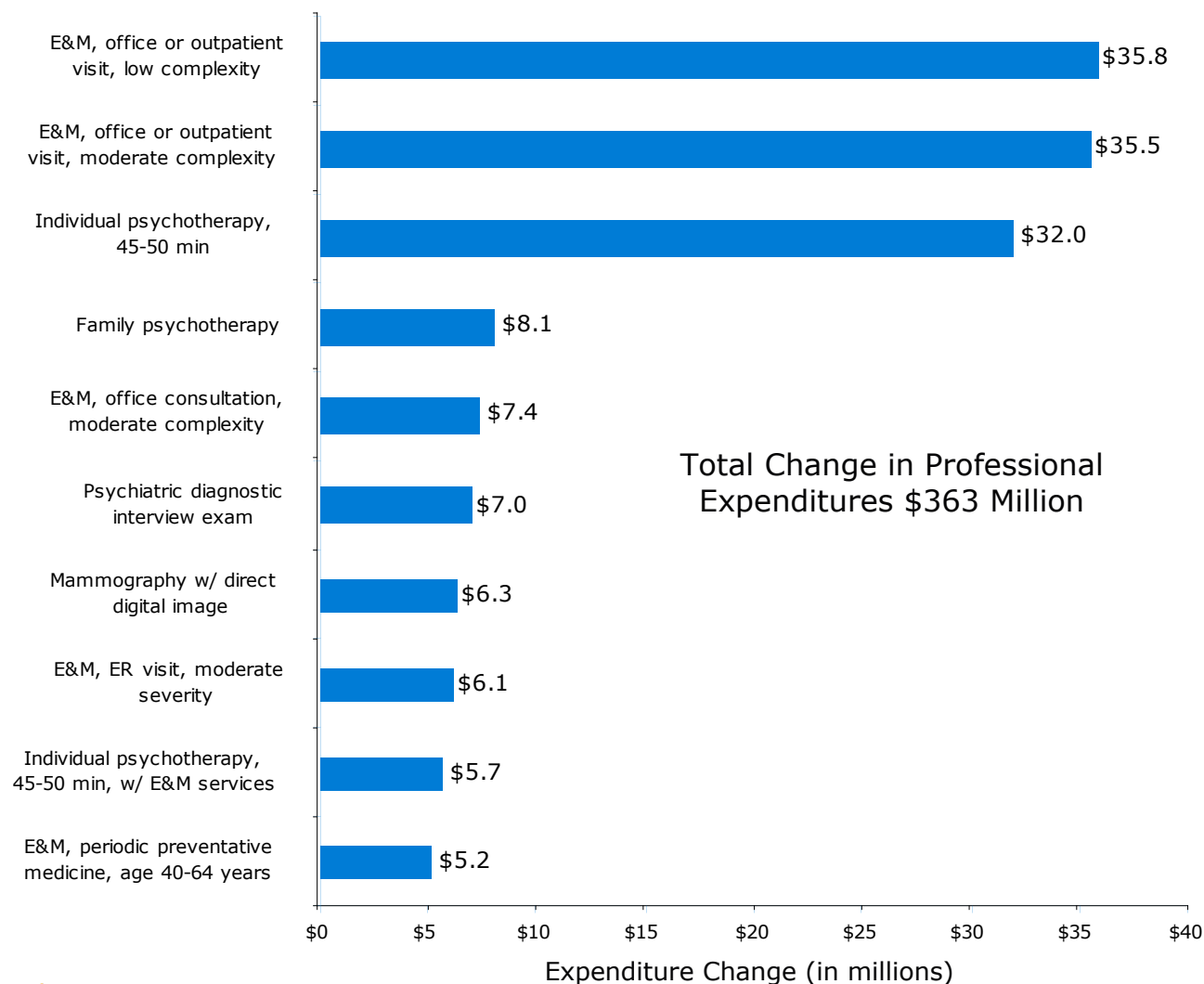
Low and moderate complexity outpatient visits accounted for the largest professional expenditures in 2008 (\$369.1 and \$257.2 million, respectively).

Individual psychotherapy accounted for the 3<sup>rd</sup> largest share of professional expenditures.

**Notes:** Data include professional charges only. Certain claims (representing 14 percent of all professional claims in 2008) are excluded. See the methods appendix for additional details.



# Selected Services Accounting for the Largest Growth in Physician/Professional Expenditures, 2007-2008



From 2007-2008, spending for E&M services for low or moderately complex patients, followed by spending for individual psychotherapy, grew more than spending for any other major professional service category.

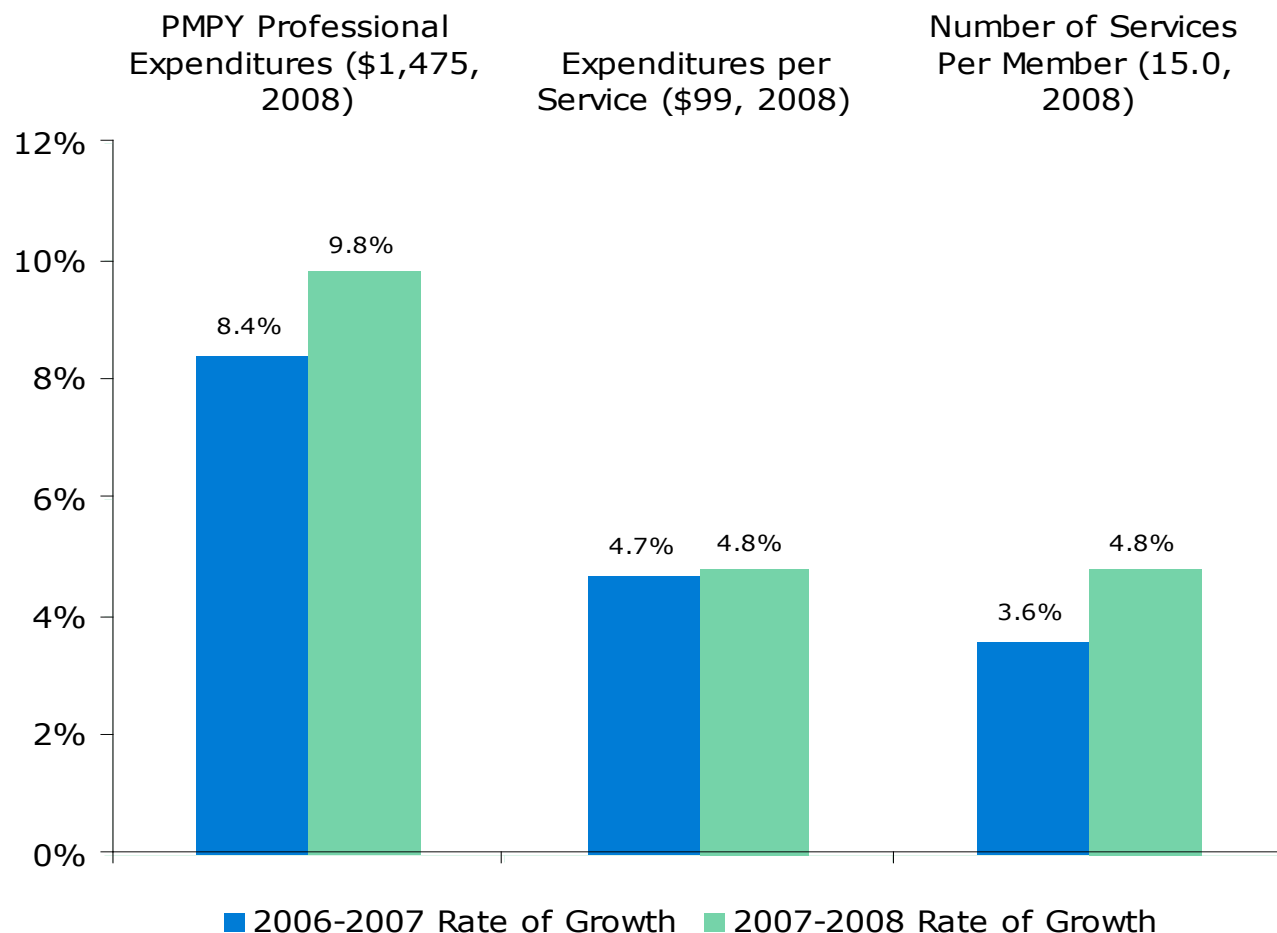
## 4.2 Physician and Other Professional Expenditures: Price Versus Volume, 2006-2008

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### Findings:

- Both expenditures per service and the number of services delivered contributed to the spending growth in professional services from 2006 to 2008.
- A more detailed analysis of prices versus volume revealed that higher prices drove all of the increase in spending from 2006 to 2007. The volume of services increased slightly, however, service mix migrated toward less costly professional services, more than offsetting the impact of higher volume.
- As with hospital inpatient and outpatient services, prices paid for professional services varied substantially, although to a lesser degree. For example, a commonly billed office visit of moderate complexity ranged from a low of \$64 to a high of \$220 and averaged \$134.

# Change in Physician/Professional Expenditures per Member, 2006-2008

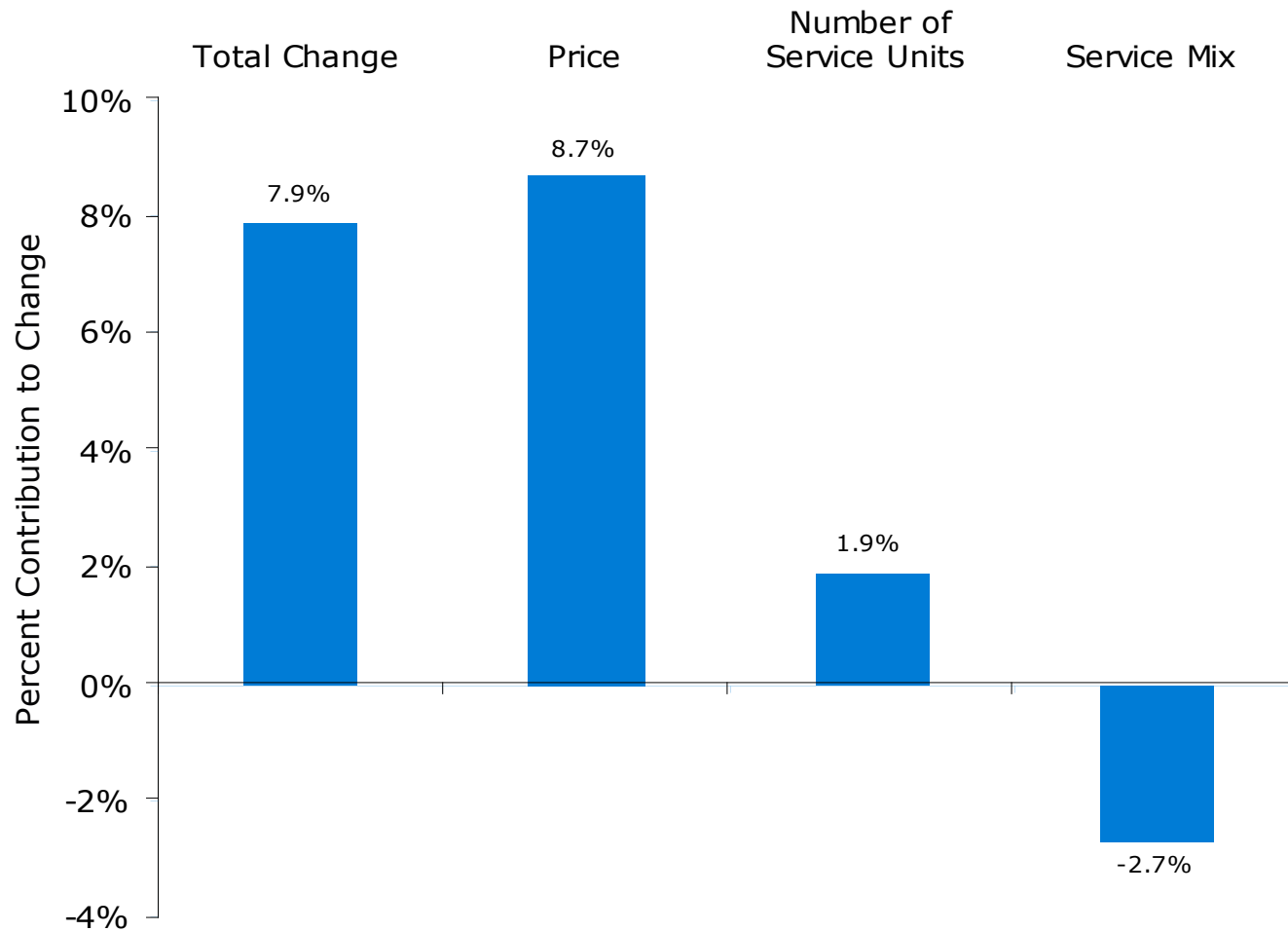


In 2006-2007, expenditures per service grew somewhat faster than the number of services per member (4.7% compared to 3.6%). Both contributed equally to expenditure growth at 4.8% in 2007-2008.

Note: Expenditures per service is calculated as the sum of expenditures divided by the number of services and can be considered a proxy for price. However, we recognize that average expenditures are affected by shifts in the mix of services to higher or lower priced services. The next slide provides a price measure that controls for that shift in service mix and represents a more accurate measure of changes in actual unit prices.

**Notes:** Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Since services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. (Injectable drugs, among other services, are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of services provided. The number of services was adjusted for missing data in 2007 and 2008. See methods appendix for additional details.

# Drivers of Change in Physician/Professional Service Expenditures (Price v. Volume), 2006-2007

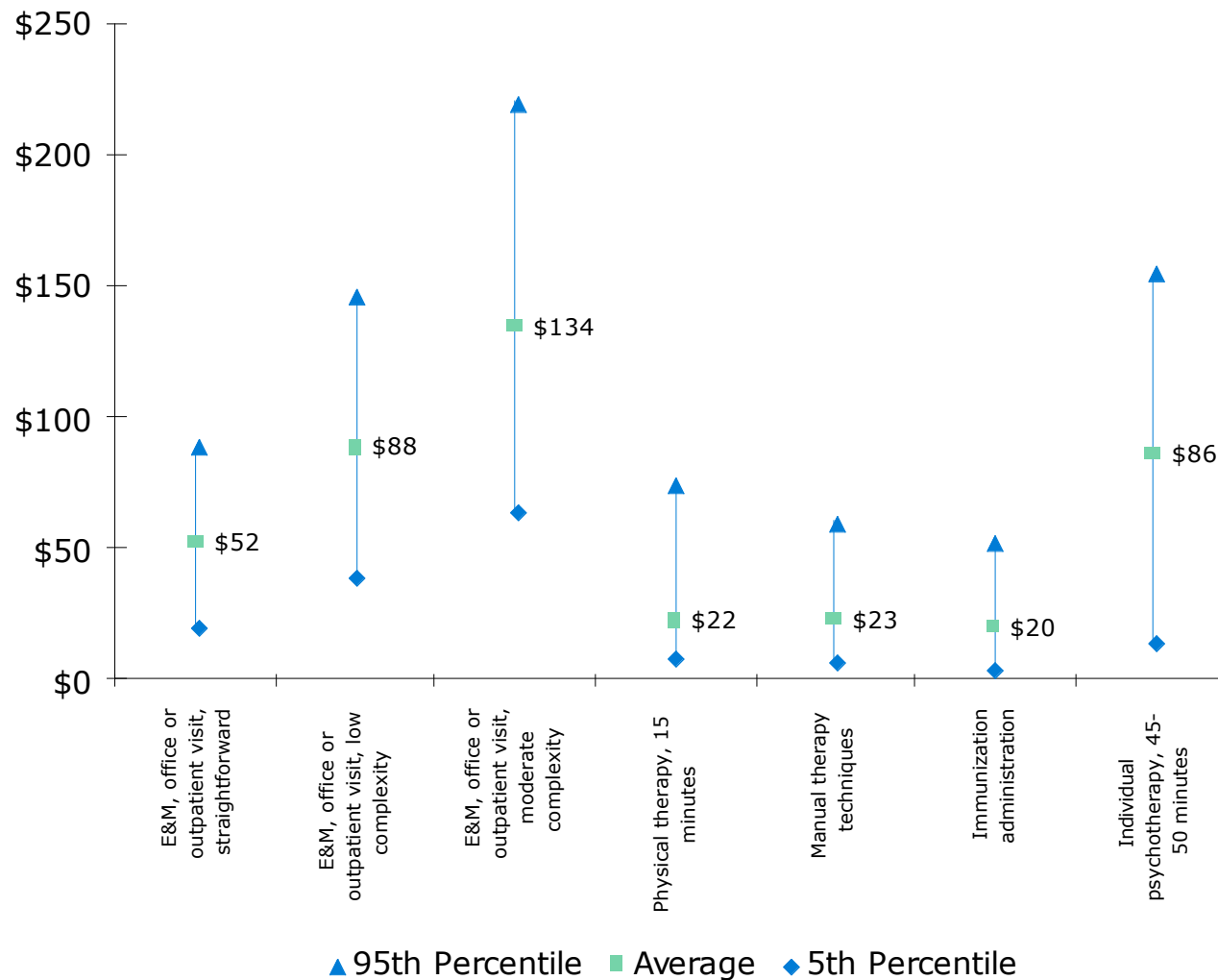


For physician/professional service expenditures, prices drove the majority of the increase in spending in 2006-2007 (8.7%). Volume accounted for only 1.9% of the change in expenditure for professional services while service mix was a negative contributor (-2.7%).

Note: To more accurately measure unit price changes, it is important to isolate price versus volume and service mix changes. To do this, we constructed a market basket that included services that occurred consistently in the years of comparison. We then decomposed its component parts: change due to price while holding utilization constant, and change due to volume while holding price constant and the remaining change due to service mix (a shift to higher or lower cost services). We are unable to control for shifting to higher cost settings. That effect is captured in the price component. For this decomposition analysis only the change from 2006 to 2007 is available. (see technical appendix in the full report).

**Notes:** Data include physician and other professional charges in any location of service (inpatient, outpatient hospital, free-standing facilities, offices, clinics and all other locations). The number of service units on a claim corresponds to the number of times the service or procedure billed for was performed. The change in the number of service units combines change in the number of insured member months, change in number of services pmpm, and change in the number of service units per service. Using service units rather than services as a measure of volume controls for differences in the amount of care billed on a single claim. (Injectable drugs, among other services, are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) Certain claims are excluded. See the methods appendix for additional details.

# Price Variation for Selected High-Frequency Physician/Professional Services, 2008



In 2008, the highest price (95<sup>th</sup> percentile) for an evaluation and management visit of moderate complexity was more than 3 times the lowest price paid (5<sup>th</sup> percentile). Insurer payments for other services also varied widely.

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## 5. Imaging Expenditures

Imaging includes standard imaging and radiology such as x-rays as well as MRI's, CT Scans and ultrasounds. Expenditures include both the professional and technical components unless otherwise noted.

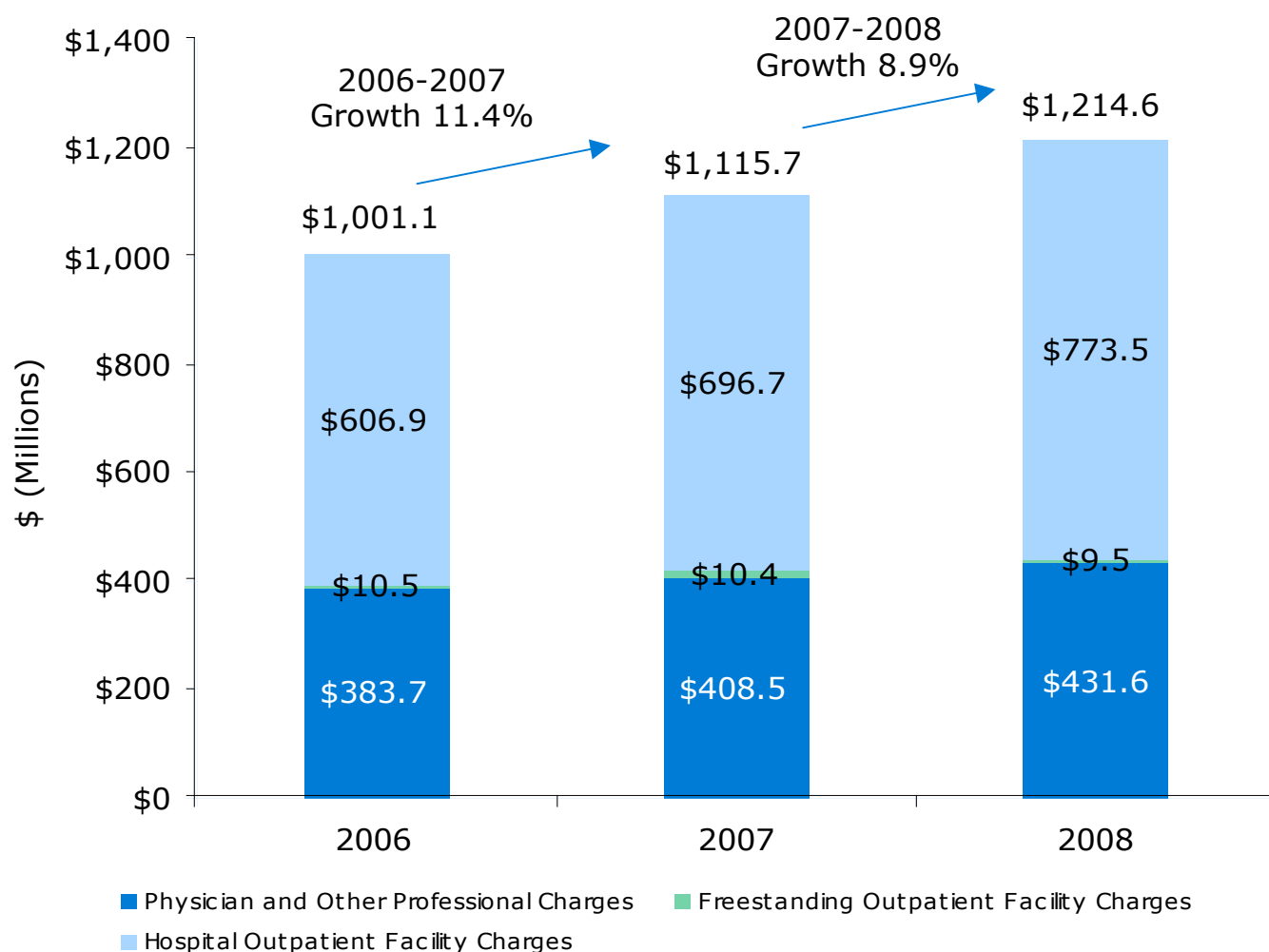
# 5.1 Spending Growth for Outpatient Imaging Services, 2006-2008

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## Findings:

- Total spending for outpatient imaging services grew 11% from 2006 to 2007 and another 9% from 2007 to 2008, reaching more than \$1.2 billion by 2008.
- Facility charges (nearly entirely from acute care hospitals) accounted for about 2/3 of all spending for imaging services while professional imaging charges accounted for about 1/3.
- Facility charges for imaging services grew 27% from 2006 to 2008 while professional imaging charges grew 12% over the period.
- Standard imaging (x-rays) made up the largest share (36%) of total imaging expenditures and increased by 16% from 2006 to 2007 and another 8% from 2007 to 2008.
- MRIs that made up 22% of imaging expenditures increased 7% and 14% from 2006 to 2007 and 2007 to 2008, respectively. CAT/CT Scans which made up 20% of total imaging expenditures increased by 7% and 5% over the same period.
- Echography and ultrasonography that made up 19% of imaging spending grew 14% from 2006 to 2007 and another 9% from 2007 to 2008.
- Digital mammography accounted for the largest share of growth in both facility and professional imaging expenditures.

# Total Privately Insured Outpatient Imaging Expenditures and Annual Growth by Provider Type



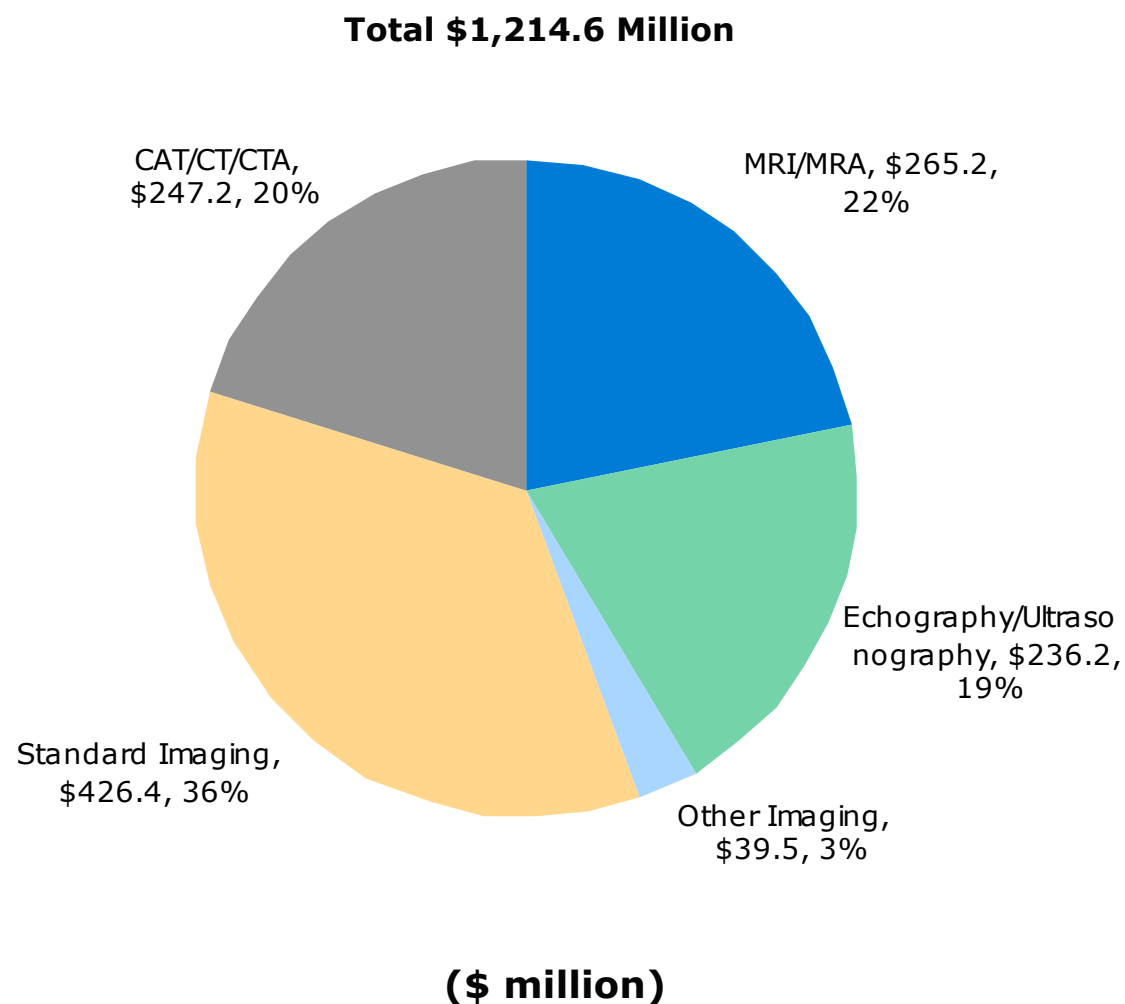
Between 2006-2007, outpatient imaging services grew by 11.4% and dropped to a growth rate of 8.9% between 2007-2008. Total spending for outpatient imaging services exceeded \$1.2 billion in 2008.

Facility charges (nearly entirely from acute care hospitals) accounted for about two-thirds of all spending for imaging services (64%) while professional charges for imaging accounted for 36% of total spending for outpatient imaging services.

**Notes:** Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

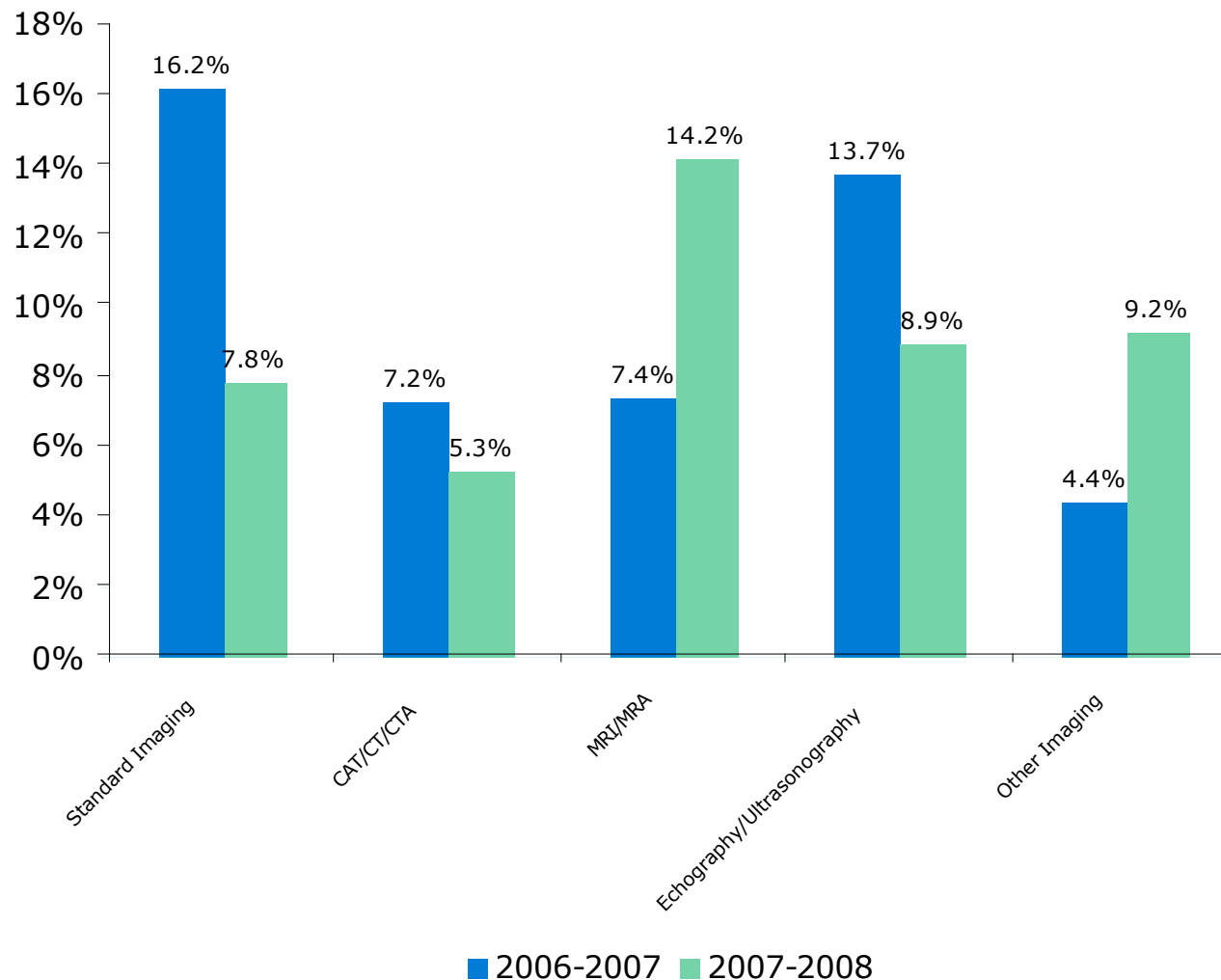


# Distribution of Privately Insured Outpatient Imaging Expenditures by Type of Service, 2008



Standard imaging accounted for 36% of total spending for imaging services (including both professional and facility charges) in 2008, followed by MRIs (22%), CAT scans (20%), and echography and ultrasound (19%).

# Annual Growth in Outpatient Imaging Expenditures by Type of Service



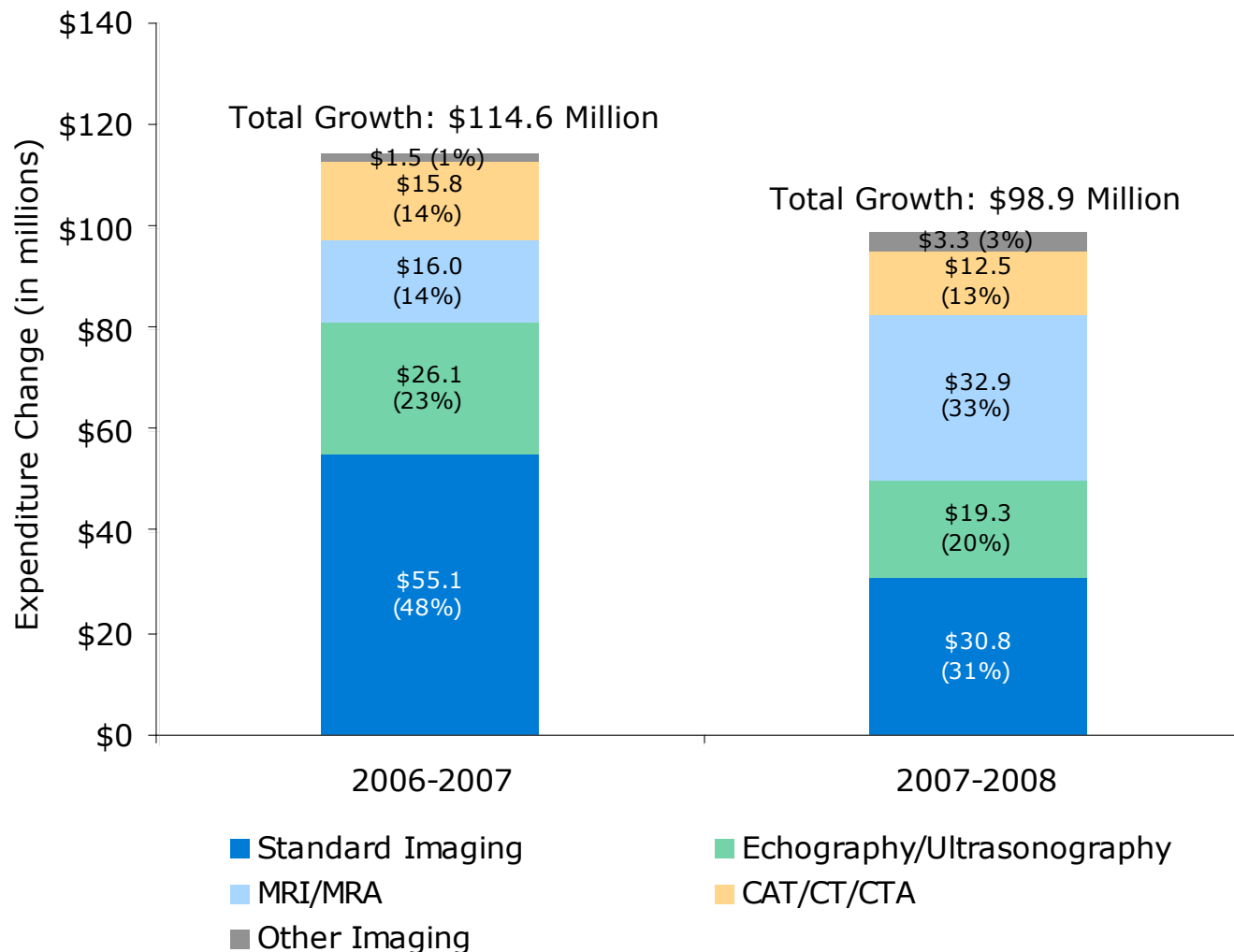
Spending for standard imaging services (the largest single component of imaging expenditures) grew by 16% in 2006-2007 followed by spending for echography and ultrasound (14%).

In 2007-2008, MRI/MRA accounted for the largest growth in outpatient imaging expenditures (14.2%) followed by other imaging (9.2%).



**Notes:** Outpatient facilities include hospitals and other freestanding outpatient facilities. Expenditures exclude facility charges for imaging provided during an inpatient stay; imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

# Contribution of Service Type to Annual Growth of Outpatient Imaging Expenditures



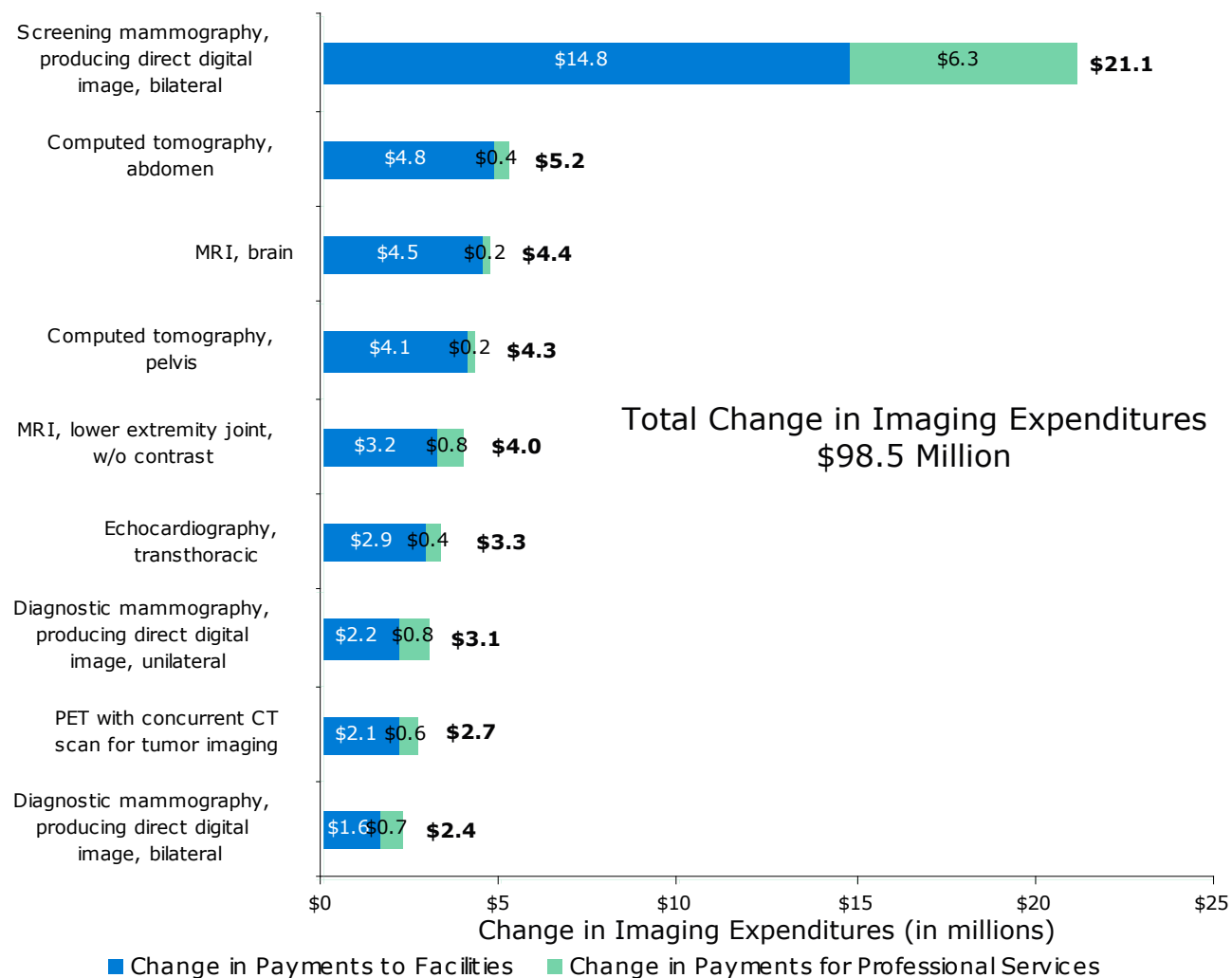
Standard imaging accounted for 31% of the increase in total spending for imaging services in 2007-2008, compared to 48% in the earlier period.

Spending for MRIs accounted for one-third of the growth in total spending for imaging services in 2007-2008, an increase over the 2006-2007 growth rate contribution of 14%.



**Notes:** Outpatient facilities include hospitals and other freestanding outpatient facilities. Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

# Selected Services Accounting for Largest Growth in Outpatient Imaging Expenditures, 2007-2008



Digital mammography was a major component of the growth in spending for imaging services. Between 2007-2008, spending for digital mammography grew \$21.1 million.

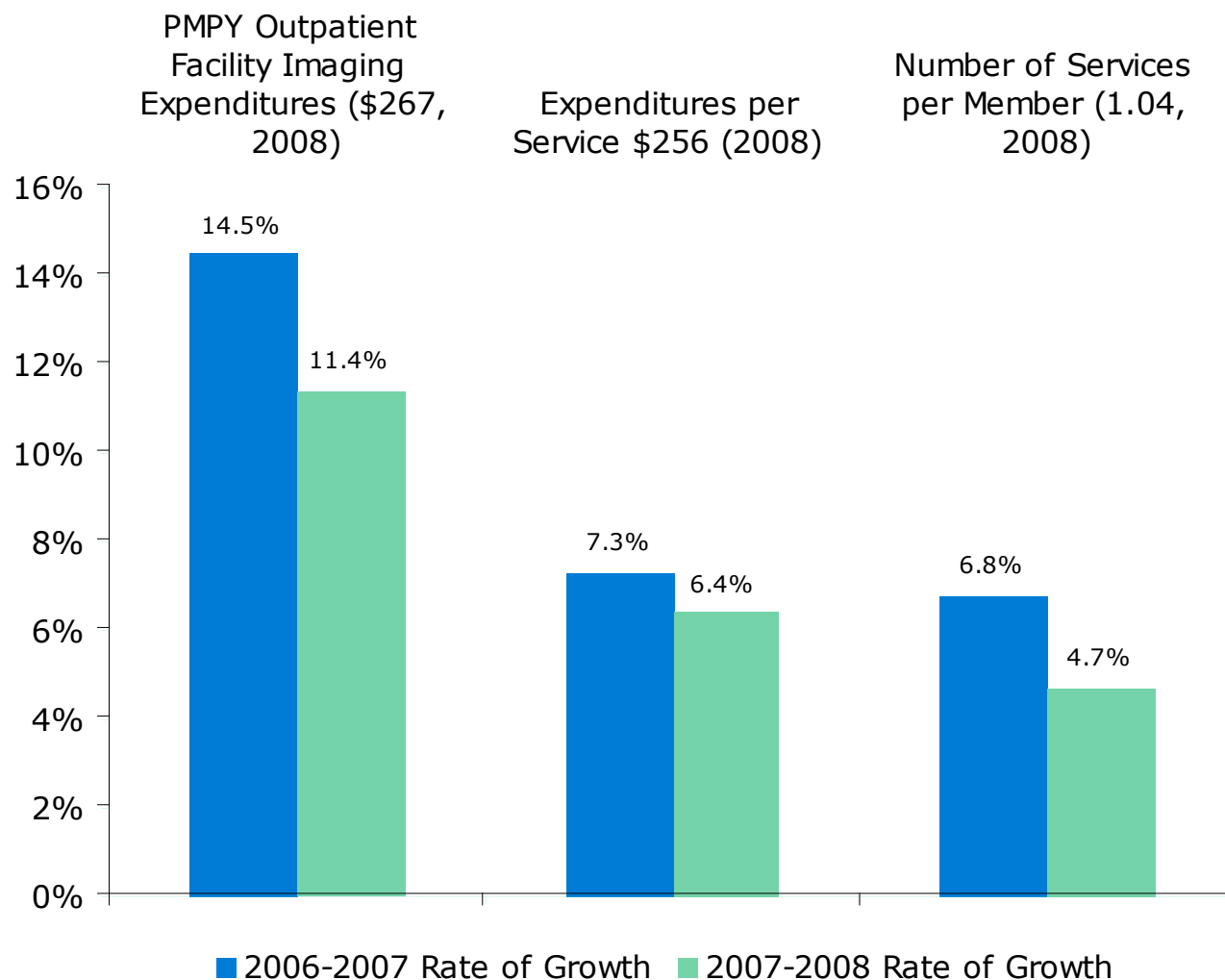
## 5.2 Imaging Expenditures: Price versus Volume, 2006-2008

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### Findings:

- While price increases were a significant driver of growth in spending for imaging services, growth in the volume of imaging services contributed significantly, even after adjusting for a slight shift to a less costly service mix.
- Average prices paid for the same imaging services were similar when provided in a hospital outpatient settings or a free-standing facility.
- In many cases the highest prices paid were 3 times the average for imaging services in the hospital outpatient or free-standing facility setting.
- Highest prices paid for professional imaging services were typically double the average.

# Change in Outpatient Facility Imaging Expenditures per Member, 2006-2008



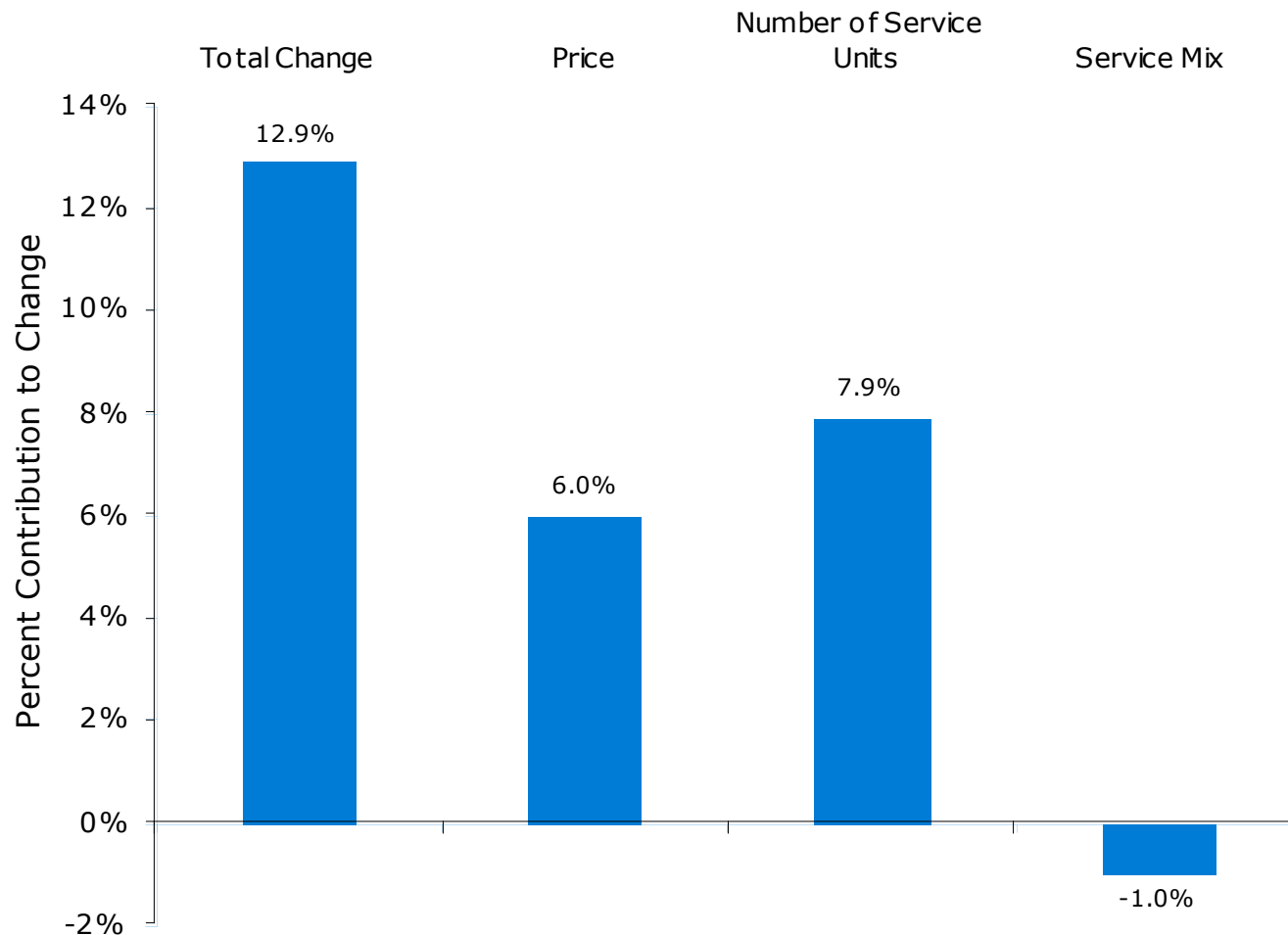
Growth in both spending per service and the number of services per member drove higher spending for imaging services from 2006 to 2008.

In 2007-2008, the effect of the increase in expenditures per service (6.4%) drove expenditure change more than the number of services per member year (4.7%).

Note: Expenditures per service is calculated as the sum of expenditures divided by the number of services and can be considered a proxy for price. However, we recognize that average expenditures are affected by shifts in the mix of services to higher or lower priced services. The next slide provides a price measure that controls for that shift in service mix and represents a more accurate measure of changes in actual unit prices.

**Notes:** Outpatient facilities include hospitals and other freestanding outpatient facilities. Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Because services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of imaging services provided. The number of services was adjusted for missing data in 2007 and 2008. See the methods appendix for additional details.

# Drivers of Change in Imaging Service Expenditures (Price v. Volume), 2006-2007

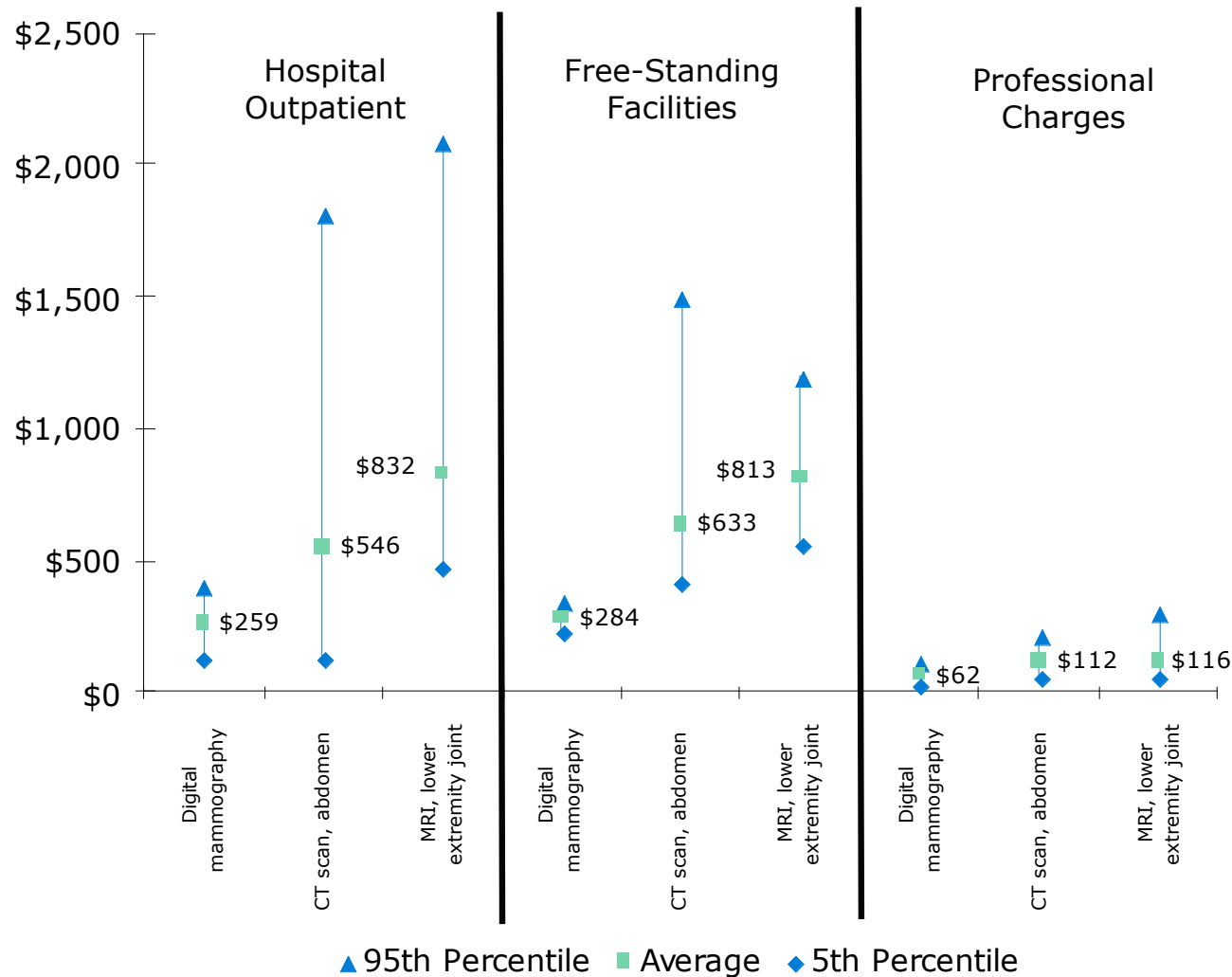


While price increases were a driver of growth in spending for imaging services in 2006-2007 (6%), growth in the volume of imaging services made a larger contribution to growth at 7.9%. The increase was offset by a slight shift to less intensive services (-1%).

Note: To more accurately measure unit price changes, it is important to isolate price versus volume and service mix changes. To do this, we constructed a market basket that included services that occurred consistently in the years of comparison. We then decomposed its component parts: change due to price while holding utilization constant, and change due to volume while holding price constant and the remaining change due to service mix (a shift to higher or lower cost services). We are unable to control for shifting to higher cost settings. That effect is captured in the price component. For this decomposition analysis only the change from 2006 to 2007 is available. (see technical appendix in the full report.)

**Notes:** Data include both facility charges for outpatient care and all physician charges where the procedure code indicated an imaging service. Data exclude facility charges for imaging provided during an inpatient stay, as inpatient imaging services typically are included in DRG payments and not billed separately. The number of service units on a claim corresponds to the number of times the service or procedure billed for was performed. The change in the number of service units combines change in the number of insured member months, change in number of services pmpm, and change in the number of service units per service. Using service units rather than services as a measure of volume controls for differences in the amount of care billed on a single claim. Certain claims are excluded. See the methods appendix for additional details.

# Price Variation of Selected High-Frequency Imaging Services by Type of Provider, 2008



For imaging procedures that accounted for the highest total spending, price varied among service providers. The greatest variation in price was found for hospital outpatient settings.

Facility price differentials tended to be greater than professional charges for the same services. The average price for a CT scan of the abdomen was \$663 at free-standing facilities vs. \$546 at an outpatient hospital facility. In each case the highest price paid was more than 3 times the average. Average prices for professional services for the same service was \$112 with the highest price paid being less than 2 times the average.



# Glossary of Terms

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## **Ambulatory care**

All types of health services that are provided on an outpatient basis, in contrast to services provided in the home or to persons who are admitted to the hospital.

## **Capitation payment**

A way of paying for health services in which doctors or other health care providers are paid a fixed amount for each patient per year, regardless of how much health care the patient uses

## **Carrier**

A private organization, usually an insurance company, that finances health care.

## **Carved out**

Regarding health insurance, an arrangement whereby an employer eliminates coverage for a specific category of services (e.g., vision care, mental health/psychological services, and prescription drugs) and contracts with a separate set of providers for those services according to a predetermined fee schedule or capitation arrangement.

## **Claim**

A claim is a request for payment for health care services a patient received.

## **Coinsurance**

A type of cost-sharing between health insurer and patient. The patient will assume a portion or percentage of the costs of covered services. The insurer will reimburse a specified percentage of all, or certain specified, covered medical expenses in excess of any deductible amounts payable by the insured. The patient is then liable for the remainder of the costs until their maximum liability is reached.

## **Co-morbidities**

Conditions that exist at the same time as the primary condition in the same patient (e.g., hypertension is a co-morbidity of diabetes).

## **Copayment**

A fixed amount of money paid by a patient at the time of service. The health plan pays the remainder of the charge directly to the provider. This is a method of cost-sharing between the patient and the plan, and serves as an incentive for the patient to use healthcare resources wisely.

## **Cost sharing**

Any provision of a health insurance policy that requires the insured individual to pay some portion of medical expenses. The general term includes deductibles, copayments, and coinsurance.

## **Coverage**

The guarantee against specific losses provided under the terms of an insurance policy. Coverage is sometimes used interchangeably with benefits or protection, and is also used to mean insurance or insurance contract.

## **Deductible**

The amount of money a patient pays for health care before the insurance company begins to pay.

## **Diagnosis related groups (DRG)**

Groupings of diagnostic categories drawn from the International Classification of Diseases and adjusted for the presence of a surgical procedure, patient age, presence or absence of significant co-morbidities or complications, and other relevant criteria.

## **Evaluation and management**

Evaluation and management services include patient office visits and consultations billed by physicians and other professionals, hospital outpatient departments, or outpatient facilities.



# Glossary of Terms

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## **Freestanding outpatient facilities**

Freestanding facilities include ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities.

## **Health plan**

An organization that provides a defined set of benefits. This term usually refers to an HMO-like entity, as opposed to an indemnity insurer. Thus, a health plan is narrower than a carrier.

## **High-deductible health plan**

A plan that provides comprehensive coverage for high-cost medical events. It features a high deductible (above \$1,000 here) and a limit on annual out-of-pocket expenses. This type of plan is usually coupled with a health savings account or a health spending account.

## **Hospital outpatient care**

Hospital outpatient care includes all ambulatory care services provided by an acute care hospital, including emergency room (ER) visits. It does not include care provided in free-standing outpatient facilities.

## **Hospital outpatient procedures**

Hospital outpatient procedures include all outpatient services that are associated with procedures (such as colonoscopy and arthroscopy) that are billed by the hospital. They generally do not include the surgeon's or physician's fee as that is billed separately and included under the physician/professional category.

## **Imaging**

Imaging includes standard imaging and radiology such as x-rays as well as MRI's, CT Scans and ultrasounds. Both the professional and technical components are included unless otherwise noted.

## **Individual coverage**

Coverage purchased independently (not as part of a group), usually directly from an insurance company.

## **Insurance market sector**

As defined here, the insurance market sectors are broken up into individual purchase, small group, mid-size group, large group and self-insured.

## **Large group**

A large group includes employers with 500 or more enrolled employees.

## **Market basket**

For each service sector of interest (inpatient hospital, outpatient hospital, free-standing outpatient facilities, and physician and professional services), a market basket of services is comprised of a consistent set of services across each comparison year. These services are then weighted by their utilization, averaged across all carriers. The market basket typically represents 90% of the expenditures in each service sector.

## **Member**

In this report, health plan members are estimated as average monthly enrollment over a twelve month calendar year, not as unique health plan members during the year.

## **Mid-size group**

A medium-sized group is defined for employers with 51-499 enrolled employees. Employers that have fewer than 51 enrollees but do not meet the definition of an eligible small employer per Massachusetts Division of Insurance Regulation 211 CMR 66.04 are included as a medium-sized group.

## **Other professionals**

Other professionals include (but may not be limited to) nurses other than primary care providers, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, and nutritionists.

## **Out-of-pocket expense**

Health care costs that you must pay on your own because they are not covered by any insurance (also see cost-sharing).

## **Outpatient services**

Outpatient services include ambulatory care services provided by hospitals as well as those provided by free-standing outpatient facilities.

## **Pay-for-performance bonus**

A payment based on a provider's performance, as measured by how well he or she meets practice guidelines, medical review criteria, and standards of quality.



# Glossary of Terms

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## **Premiums**

The amount you pay to belong to a health plan. If you have employer-sponsored health insurance, your share of premiums are usually deducted from your pay.

## **Primary care**

Basic or general health care. It is ideally the patient's first encounter with the medical care system. Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners.

## **Privately insured**

The privately insured in this report included all insured Massachusetts residents with comprehensive medical benefits except for enrollees in Medicare, Medicaid, the Federal Employee Health Benefit Plan (FEHBP) and Commonwealth Care.

## **Professional services**

Professional services include those services rendered by MD's, (primary care and specialists) as well as nurse practitioners, physician's assistants, chiropractors, physical/occupational therapists, psychologists, nurses, etc.

## **Self-insured plan**

An employer or group of employers assumes the risk for covering the cost of health benefits for their employees. Benefits may be administered by the employers or handled through an administrative service-only agreement with an insurance carrier or third-party administrator.

## **Service mix**

The distribution of services in the market basket for each service type of interest (inpatient hospital, outpatient hospital, free-standing outpatient facilities, and physician and professional services).

## **Service sector**

Service sector is defined by the categories of healthcare providers, such as hospital inpatient, hospital outpatient, physician and professionals, and pharmacy.

## **Small group**

A small group is defined as an "eligible small business or group" per Massachusetts Division of Insurance Regulation 211 CMR 66.04 with fewer than 51 enrollees. Employers that have fewer than 51 enrollees but do not meet the definition of an eligible small employer are included as a medium-sized group.

## **Specialist**

A physician or other health professional who is specially trained in a certain branch of medicine related to specific services or procedures (e.g., surgery, radiology, pathology); certain body systems (e.g., dermatology, orthopedics, cardiology); or certain types of diseases (e.g., allergy). Specialists usually have advanced education and training related to their specialties.

## **Standard imaging**

Standard imaging includes standard or digital x-rays

## **Teaching hospital**

Teaching hospitals are defined according to the Medicare Payment Advisory Commission's (MedPAC) definition: at least 25 full time equivalent medical school residents per 100 inpatient beds. (see list of teaching hospitals at end of this report).

## **Withhold**

A form of compensation whereby a health plan withholds payment to a provider until the end of a period at which time the plan distributes any surplus based on some measure of provider efficiency or performance.



# Teaching and Community Hospitals in Massachusetts

- In this analysis, teaching hospitals are defined according to the Medicare Payment Advisory Commission's (MedPAC) definition of a major teaching hospital: at least 25 full time equivalent medical school residents per one hundred inpatient beds.
- The Division of Health Care Finance and Policy analyzed the most current available hospital cost reports to determine which hospitals met this criteria. For the purposes of this analysis, the 15 hospitals meeting this criteria were assigned to the teaching cohort for all the years of this analysis.

## Teaching Hospitals

Baystate Medical Center  
 Beth Israel Deaconess Medical Center  
 Boston Medical Center  
 Brigham and Women's Hospital  
 Cambridge Health Alliance  
 Caritas St. Elizabeth's Medical Center  
 Children's Hospital Boston  
 Dana-Farber Cancer Institute  
 Lahey Clinic  
 Massachusetts Eye and Ear Infirmary  
 Massachusetts General Hospital  
 Mount Auburn Hospital  
 Saint Vincent Hospital  
 Tufts Medical Center  
 UMass Memorial Medical Center

## Community Hospitals

Anna Jaques Hospital	Marlborough Hospital
Athol Memorial Hospital	Martha's Vineyard Hospital
Baystate Franklin Medical Center	Mercy Medical Center
Baystate Mary Lane Hospital	Merrimack Valley Hospital
Berkshire Medical Center	MetroWest Medical Center
Beth Israel Deaconess Hospital-Needham	Milford Regional Medical Center
Cape Cod Hospital	Milton Hospital
Caritas Carney Hospital	Morton Hospital and Medical Center
Caritas Good Samaritan Medical Center	Nantucket Cottage Hospital
Caritas Holy Family Hospital	Nashoba Valley Medical Center
Caritas Norwood Hospital	New England Baptist Hospital
Clinton Hospital	Newton-Wellesley Hospital
Cooley Dickinson Hospital	Noble Hospital
Emerson Hospital	North Adams Regional Hospital
Fairview Hospital	North Shore Medical Center
Falmouth Hospital	Northeast Hospital Corporation
Faulkner Hospital	Quincy Medical Center
Hallmark Health	Saint Anne's Hospital
Harrington Memorial Hospital	Saints Medical Center
Health Alliance Hospital	Signature Healthcare Brockton Hospital
Heywood Hospital	South Shore Hospital
Holyoke Medical Center	Southcoast Hospitals Group
Jordan Hospital	Sturdy Memorial Hospital
Lawrence General Hospital	Winchester Hospital
Lowell General Hospital	Wing Memorial Hospital and Medical Centers

**Division of Health Care Finance and Policy**  
**Two Boylston Street**  
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**Publication Number: 10-43-HCF-07**

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# **Massachusetts Health Care Cost Trends Final Report**

## **Appendix A.3b**

### **Part III: Health Spending Trends for Privately Insured 2006-2008**

#### **Technical Report**

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# **Massachusetts Health Care Cost Trends Part III: Health Spending Trends for Privately Insured 2006-2008**

**Technical Report**

**Deborah Chollet, Su Liu, Allison Barrett,  
Kate Stewart, and Thomas Bell  
Mathematica Policy Research, Inc.**

**February 2010**



Deval L. Patrick, Governor  
Commonwealth of Massachusetts  
Timothy P. Murray  
Lieutenant Governor

JudyAnn Bigby, Secretary  
Executive Office of Health and Human Services  
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## **Introduction**

Nationally, spending for health care represents an increasing share of total economic activity, displacing production in other sectors of the economy. Estimated at less than 14 percent of Gross Domestic Product (GDP) in 1993, national health care spending is projected to reach 17.7 percent of GDP in 2010.<sup>1</sup>

Historically, per capita spending for privately insured health care services has grown faster than personal income, both nationally and in Massachusetts. Since 2006, this pattern has continued, despite stronger growth in personal income in Massachusetts than nationally. While Massachusetts residents' per capita personal income grew at an average rate of 4.1 percent per year from 2006 to 2008,<sup>2</sup> spending for privately insured health care services per member year grew 7.5 percent each year.

For privately insured residents of the Commonwealth, this growing cost burden manifests as rising payments for health insurance, as well as higher out-of-pocket costs as both covered employees and individuals who buy health insurance directly have accepted greater cost sharing to keep premiums affordable.

This report documents the major trends in total spending for care covered by fully-insured and self-insured comprehensive private health plans in Massachusetts from 2006 to 2008. Spending includes the amounts paid by insurers and self-insured employers, as well as cost sharing (such as co-payments and deductibles) paid by patients. Findings are based on claims data provided by six major health insurers in Massachusetts and represent roughly 65 percent privately insured Massachusetts residents. Carriers also reported payments to providers that did not flow through their claims systems—including capitation payments, withholds, and pay-for-performance bonuses; these amounts also are presented.<sup>3</sup> Spending estimates were adjusted actuarially to account for claims that were incurred but not yet reported, as well as for prescription drug spending that was “carved out” of comprehensive benefits and therefore not reported.<sup>4</sup> All estimates exclude spending under public coverage plans such as CommonwealthCare, Medicaid, and Medicare.

Throughout this report, spending is reported in total and per health plan member year. Total spending is the sum of all spending during the calendar year. Member years are calculated as average monthly enrollment during the calendar year.

## Section A:

# Background and Overview of Spending Change

In Massachusetts, total spending per member year grew 15.5 percent from 2006 to 2008, reflecting annual growth of 7.5 percent in both 2007 and 2008 (Figure A.1).<sup>5</sup> Relatively fast growth in spending for hospital outpatient care (13.7 percent in 2008), physician and other professional services (9.8 percent in 2008), and inpatient hospital care (7.9 percent in 2008) drove faster growth in total spending per member year than would otherwise have occurred.<sup>6</sup> In contrast, spending for prescription drugs grew 3.9 percent from 2006 to 2007, and 2.7 percent from 2007 to 2008.

In 2008, physician and other professional services and hospital outpatient services (the two largest categories of spending) together accounted for 57 percent of total spending for covered services (32 percent and 25 percent, respectively). Inpatient hospital care and prescription drugs together accounted for 35 percent of total spending (17 and 18 percent, respectively) (Figure A.2).

As noted above, the analysis in this report is based on private insurance claims, as reported by the six largest private health insurance carriers in Massachusetts. Two aspects of the underlying enrollment data for these estimates are worthy of mention. First, total enrollment among the reporting carriers held steady from 2006 to 2007, but then declined slightly in 2008—possibly reflecting the effects of growing economic recession, some redistribution of business toward smaller carriers, or both (Figure A.3). While the net loss in total enrollment was slight, there was a significant redistribution of insured lives toward self-insured plans and individual coverage. In 2008, the self-insured and individually insured sectors accounted for, respectively, 41.5 percent and 2.4 percent of all privately insured lives (in Figure A.3, measured as member years), compared with 38.9 percent and 1.6 percent in 2006.<sup>7</sup>

Second, enrollment in high-deductible health plans (defined here as plans with a deductible above \$1,000) grew substantially from 2006 to 2008. By 2008, enrollment in high-deductible plans represented about 11 percent of all enrolled lives (331,000 member years, Figure A.4), compared with less than 4 percent in 2006.<sup>8</sup> Consistent with greater enrollment in high-deductible plans, patient cost sharing increased as a percent of total spending from 2006 to 2008, particularly for individuals but also for small- and mid-sized groups (Figure A.5). However, in self-insured and large groups, cost sharing declined: in the aggregate, enrollees in those plans paid less as a percent of total spending in 2008 than in 2006.<sup>9</sup> Coupled with changes in enrollment, these changes in cost sharing probably drove much of the change in spending within insurance market sectors that we observe.<sup>10</sup>

## Major Findings

### Total Expenditures

- Spending per member year grew 15.5 percent from 2006 to 2008—rising 7.5 percent each year (Table A.1).

- Spending per member year for outpatient hospital care grew much faster than for services in any other major category, rising 12 percent in 2007 and 14 percent in 2008. Spending per member year for physician care grew 8 percent from 2006 to 2007 and 10 percent from 2007 to 2008. In contrast, spending for hospital inpatient care grew 9 percent from 2006 to 2007, but slowed to 8 percent from 2007 to 2008.

### Outpatient Care

- Spending per member year for hospital outpatient care grew 27 percent from 2006 to 2008, by 12 to 14 percent each year. At the same time, spending for outpatient care in freestanding facilities—already a small component of total outpatient spending—declined (Table A.1). Overall, including care in both hospital outpatient departments and in freestanding outpatient facilities, outpatient spending per member year grew nearly 23 percent from 2006 to 2008.
- Hospital outpatient care accounted for 37 percent of the growth in total spending from 2006 to 2008 (Figure A.6). Including payments for inpatient and outpatient care, hospital services accounted for more than half of the growth in total spending (56 percent) from 2006 to 2008.

### Physician and Other Professional Services

- Total spending for physician and other professional services also grew rapidly, by 8 percent in 2007 and 10 percent in 2008 (Table A.1). Physician and other professional services accounted for 39 percent of the growth in total spending from 2006 to 2008 (Figure A.6).
- Increased payments to specialists accounted for about half of the growth in total spending for physician and other professional services in both 2007 and 2008, while payments to primary care providers accounted for about a third (see Section D).

### Inpatient Care

- Total spending for inpatient care grew 7 percent from 2007 to 2008, slowing from 9 percent growth the year before (see Section B). Cumulatively, from 2006 to 2008, spending for hospital inpatient care grew nearly 17 percent.
- Surgical DRGs are the largest component of inpatient care and accounted for about half of the growth in total spending each year. Total spending for surgical DRGs grew \$85.8 million from 2006 to 2007, and another \$81.6 million from 2007 to 2008. Total spending for inpatient maternity care (for both mothers and newborns) grew just \$13.4 million from 2007 to 2008, much less than from 2006 to 2007.
- Spending per member year for inpatient care grew 18 percent from 2006 to 2008. In 2008, average spending for inpatient care among enrollees in individual coverage (\$986 per member year) was greater than the average in small groups (\$666), medium-sized groups (\$699), large groups (\$787), or self-insured plans (\$828). However, with greater enrollment in the individual market, inpatient spending per member year fell 5 percent from 2007 to

2008—narrowing the gap in spending per member year among insurance market sectors. In contrast, inpatient spending per member year in self-insured plans grew 10 percent from 2007 to 2008, slightly faster than from 2006 to 2007.

- Most of the growth in average spending for inpatient care from 2006 to 2008 was associated with increased spending per inpatient day. Spending per inpatient day grew nearly 9 percent from 2006 to 2007 and more than 7 percent from 2007 to 2008, while both the rate of admissions (per member year) and the average length of stay grew modestly, if at all.

### Insurance Market Sectors

- Spending per member year among individually insured residents grew just 2 percent from 2006 to 2008—including 4-percent growth from 2006 to 2007, followed by a 2-percent drop from 2007 to 2008 (Table A.2). Lower spending per member month in 2008 apparently reflected new enrollment by individuals with lower health care needs in 2008, the purchase of individual plans with greater cost sharing, or both. However, despite relatively low growth, spending per member year among individuals remained much higher than among insured or self-insured groups—at least in part, reflecting the older average age of enrollees with individual coverage.<sup>11</sup>
- In self-insured plans, greater enrollment and lower out-of-pocket cost as a percent of total spending coincided with growth in average spending (per member year). In 2008, spending per member year in self-insured groups grew nearly 9 percent, faster than among fully insured groups. In the fully insured market, spending per member year grew 7 percent in small groups, 6 percent in medium-sized groups, and nearly 8 percent in large groups. Self-insured plans accounted for 62 percent of the growth in total spending from 2006 to 2008, and 70 percent of the growth in total spending from 2007 to 2008.

### Teaching and Nonteaching Hospitals

- Teaching hospitals accounted for 64 percent of total spending for inpatient care in 2008, and 65 percent of the growth in total inpatient spending from 2006 to 2008, reflecting both increases in spending per patient day and admissions per member year (see Section B). Teaching hospitals outside the Boston metro area saw the fastest growth in both spending per patient day (22 percent, unadjusted for case mix) and days per admission rose (5 percent) from 2006 to 2008.
- Spending per patient day (unadjusted for case mix) rose much faster in nonteaching hospitals (22 percent) than in teaching hospitals (16 percent) from 2006 to 2008, reflecting slower growth in spending per inpatient day in Boston metro area teaching hospitals in particular (16 percent). For nonteaching hospitals, patient spending per member year rose somewhat more slowly than for teaching hospitals due only to declining admissions per member year (specifically in nonteaching hospitals outside the Boston metro area) and declining days per admission.

### Imaging Services

- Imaging services accounted for 24 percent of total spending for outpatient services in 2008, but 28 percent of the growth in total outpatient spending from 2006 to 2008 (see Section C). Spending for the facility component of imaging services grew twice as fast as spending for the professional services component (see Section E).

### Drivers of Expenditure Change

- Higher prices accounted for much of the growth in spending for inpatient and outpatient care as well as for professional services from 2006 to 2007 (Table A.2). Changes in service mix favored the delivery of less costly hospital outpatient services as well as less costly physician and professional services—offsetting some of the expenditure growth that would otherwise have occurred due to increases in prices as well as greater volume of services.
- Higher prices accounted for about half of the growth in spending for imaging services from 2006 to 2007, reinforced by greater volume of imaging services. Spending for digital mammography grew especially fast: digital screening mammography and digital diagnostic mammography together accounted for 27 percent of the growth in spending for imaging services from 2006 to 2008 (see Section E).

### Price Variation

- The prices that carriers pay for any selected service typically vary across carriers and providers (see Sections B through E). In 2008, the prices paid for services that accounted for (either or both) high total expenditure or high expenditure growth varied by orders of magnitude, with price differentials typically equating to hundreds of dollars for the same service. The variation in dollar amounts was typically much greater for facility charges than for professional charges.

### System Efficiency: Hospital Readmissions

- About 7 percent of medical and surgical hospitalizations in 2007 resulted in at least one readmission (see Section F). Both the number of readmissions and spending (per member year) for readmissions were higher for medical DRGs than surgical DRGs, and higher in teaching than in non-teaching hospitals.
- Patients who were readmitted within 30 days were less likely to have seen a physician following discharge than patients who were not readmitted. Among all medical and surgical DRGs, 66 percent of patients who were readmitted in 2007 saw a physician following discharge, compared with 73 percent of patients who were not readmitted.



## **Section B:**

# **Spending for Hospital Inpatient Care**

Key findings with respect to the change in spending for hospital inpatient care from 2006 to 2008 are reported below. As indicated earlier, throughout this report, spending includes private insurer and self-insured employer plan payments, as well as patient cost sharing. In this section, we report only payments related to facility charges for acute inpatient care—that is, payments to institutional providers, but not to physicians or for other professional services provided during an inpatient stay when those services were billed separately. When billed separately, payments for inpatient physician and other professional services are reported in Section D.

### **1. Inpatient Spending by Insurance Market Sector and Service Type**

Insured plans—including insured large and medium-sized groups as well as small groups and individuals—accounted for more than half (55 percent) of all spending for inpatient care in 2008. Self-insured group plans accounted for the rest.

Carriers use diagnosis-related groups (DRGs) to classify hospital admissions. Across all insurance market sectors, about half of all spending for inpatient care in 2008 was for surgical DRGs (53 percent). Medical diagnoses and maternity accounted for 31 percent and 15 percent of inpatient spending, respectively.

- Residents in insured health plans accounted for 55 percent of all spending for inpatient care in 2008, while those in self-insured employer plans accounted for 45 percent (Figure B.1). Insured small-group and individual plans together accounted 21 percent of total inpatient spending in 2008; large- and medium-sized insured group plans accounted for 34 percent.
- In 2008, surgical DRGs accounted for more than half of total spending for inpatient care (53 percent or \$1.18 billion, Figure B.2). Medical DRGs accounted for 31 percent (\$695 million), while maternity DRGs accounted for 15 percent (\$334 million).

### **2. Change in Inpatient Spending**

Growth in spending for inpatient care per member year slowed in 2008, reflecting slower growth in inpatient spending per member year in small- and medium-sized commercially insured groups and lower inpatient spending per member year in large insured groups.

- Total expenditures for inpatient care grew 9 percent from 2006 to 2007, and 7 percent from 2007 to 2008 (Figure B.3). Cumulatively, from 2006 to 2008, spending for hospital inpatient care grew nearly 17 percent.
- From 2006 to 2008, spending for inpatient care grew \$323.2 million (Figure B.4). Self-insured plans accounted for nearly two-thirds of this growth (\$205.6 million, or 63 percent). Coinciding with higher enrollment in self-insured plans in 2008, self-insured spending



accounted for more than 80 percent of the growth in total inpatient spending from 2007 to 2008.

- Spending for individually insured inpatient care grew \$21.6 million from 2006 to 2008, accounting for 7 percent of the growth in total inpatient spending over that period. Most of this growth coincided with implementation of Massachusetts' coverage reforms in 2008 and greater enrollment in individual plans.
- Commercially insured groups plans accounted for 30 percent of the growth in inpatient spending from 2006 to 2008. Medium-sized and small insured groups respectively accounted for 11 percent and 16 percent of the growth in total spending, while insured large groups accounted for just 3 percent. The very low growth in large-group spending for inpatient care from 2006 to 2008 reflects modest inpatient spending growth from 2006 to 2007 (14 percent of total inpatient spending growth) and a decline in spending for inpatient care from 2007 to 2008 (Figure B.4a).
- Surgical DRGs are the largest component of spending for inpatient care and accounted for about half of the growth in total inpatient spending in both 2007 and 2008—\$85.8 and \$81.6 million, respectively (Figure B.5).
- In 2008, spending for inpatient maternity care grew just \$13.4 million, much less than in 2007.

### 3. Average Inpatient Spending

Average spending (per member month) for inpatient care was greater for residents with individual coverage than for residents in either insured or self-insured group plans, but the gap has narrowed. In both 2007 and 2008, average inpatient spending declined among residents with individual coverage, but increased for residents in insured or self-insured group plans. As a result, average inpatient spending was more similar among insurance market sectors in 2008 than in 2006.

- Average spending for inpatient care was \$766 (per member year) in 2008, 18 percent higher than in 2006 (Table B.1). In 2008, average spending for inpatient care among enrollees in individual coverage was \$986, greater than the average in small groups (\$666), medium-sized groups (\$699), large groups (\$787), or self-insured plans (\$828).
- Fully insured groups and individuals saw slower growth in average inpatient spending from 2007 to 2008 than from 2006 to 2007. In the individual market, inpatient spending per member year fell 5 percent in 2008—as younger (and apparently healthier) adults enrolled in individual coverage.<sup>12</sup> In contrast, inpatient spending per member year in self-insured plans increased 10 percent from 2007 to 2008, slightly faster than from 2006 to 2007.

## 4. Components of Growth in Average Inpatient Spending

The relatively slow growth of spending for maternity care in self-insured and insured group coverage largely drove the slower growth in average inpatient spending overall from 2007 to 2008. Only in individual plans did spending for maternity care increase faster from 2007 to 2008 than from 2006 to 2007.<sup>13</sup> Aggregated across market sectors, slower growth in spending for maternity care reflected slightly fewer maternity admissions per member year as well as slower growth in spending per admission. In contrast, inpatient spending per member year for medical and surgical services grew at about the same annual rate from 2006 to 2007 and from 2007 to 2008.

- Average spending for inpatient care grew 9 to 10 percent from 2006 to 2007 for medical, surgical, and maternity inpatient stays alike (Table B.2). However, from 2007 to 2008, spending for inpatient maternity care slowed markedly. While average spending for medical and surgical stays continued to grow 9 percent and 8 percent, respectively, average spending for maternity care increased less than 5 percent—about half as fast as from 2006 to 2007.
- In both years, most of the growth in average spending for inpatient care was associated with increased spending per inpatient day. Spending per inpatient day increased nearly 9 percent from 2006 to 2007 and more than 7 percent from 2007 to 2008, while both the rate of admissions (per member year) and the average length of stay grew modestly, if at all (Table B.2).
- Both the rate of admissions (per member year) and average length of stay declined markedly among residents with individual coverage, coinciding with significant enrollment growth in that sector (Table B.3). From 2007 to 2008, average inpatient spending declined 5 percent among residents with individual coverage, reflecting 9 percent fewer admissions per member year and nearly 2 percent fewer days per admission. Spending per inpatient day increased 6 percent among residents with individual coverage—about the same as for large insured groups.
- Self-insured plans experienced the fastest growth in inpatient spending per member year (10 percent) from 2007 to 2008, compared with insured small groups (6 percent), medium-sized groups (5 percent) or large groups (6 percent). The faster growth in self-insured plan spending per member year was associated with high growth in spending per inpatient day (9 percent, comparable to small insured groups), as well as growth in the number of admissions per member year. In contrast, admissions per member year fell in each of the insured sectors.

## 5. Differences in Inpatient Spending by Hospital Teaching Status and Service Area

Teaching hospitals Massachusetts accounted for 64 percent total spending for inpatient care in 2008, and 65 percent of the growth in total inpatient spending from 2006 to 2008. In general, the highest spending per admission and the longest lengths of stay were associated with teaching hospitals.

From 2006 to 2008, the number of admissions per member year to either teaching hospitals or Boston-area nonteaching hospitals grew, nonteaching hospitals outside the Boston area saw declining admissions. Overall, there was a small increase in the proportion of patients who, when hospitalized, were admitted to teaching hospitals instead of nonteaching hospitals.

- In 2008, teaching or tertiary care hospitals accounted for 64 percent of spending for inpatient care—including 70 percent of spending for surgical DRGs, 56 percent of spending for medical DRGs, and 59 percent of spending for maternity DRGs (Figure B.6).<sup>14</sup>
- Reflecting the regional concentration of teaching and nonteaching hospitals in Massachusetts, Boston-area hospitals accounted for nearly 70 percent of total spending for inpatient hospital care in 2008. Teaching hospitals accounted for about three fourths of total inpatient spending in the Boston area.
- Spending for inpatient care Massachusetts grew \$323.2 million from 2006 to 2008 (Figure B.7). Teaching hospitals in the Boston metro area accounted for more than half of this growth (\$156.8 million, or 51 percent), while teaching hospitals in other areas of the state accounted for 14 percent (\$44.1 million).
- From 2007 to 2008, spending for inpatient care in non-Boston teaching hospitals grew 14 percent, accounting for 22 percent of the total growth in inpatient expenditures, and substantially exceeding for the growth of spending for either teaching hospitals (7 percent) or non-teaching hospitals (9 percent) in the Boston area (Figures B.7a and B.8). Total spending for inpatient care in nonteaching hospitals outside the Boston area grew less than 4 percent.
- Admissions per member year to Boston-area teaching and nonteaching hospitals grew about 2 percent from 2006 to 2008—with somewhat faster growth in admissions to Boston-area teaching hospitals—while admissions to hospitals outside the Boston metro area declined (Figure B.9) From 2007 to 2008, admissions per member year to teaching hospitals outside the Boston area grew nearly 2 percent—about the same rate of growth as for Boston-area teaching hospitals, while admissions to nonteaching hospitals outside the Boston area continued to decline (-3 percent). In 2008, teaching hospitals in Massachusetts accounted for nearly 49 percent of admissions, compared with about 47 percent in 2006 (data not shown).
- In 2008, the average cost per inpatient admission to Boston-area teaching hospitals exceeded \$15,000. Unadjusted for case mix, this was 81 percent more than the cost per admission to nonteaching hospitals in the Boston area and 21 percent more than the average cost per admission to non-Boston teaching hospitals (Table B.4). This higher cost per admission largely reflected higher spending per inpatient day in Boston-area teaching hospitals compared with teaching hospitals in other areas of the state. Teaching hospitals, whether in or outside the Boston area, had both longer stays per admission and higher spending per inpatient day (unadjusted for case mix) than nonteaching hospitals.
- Boston-area teaching hospitals saw slower growth in spending per day (unadjusted for case mix) from 2007 to 2008 (6 percent), than from 2006 to 2007 (9 percent). In addition, the average length of stay in Boston-area teaching hospitals continued to decline, although less

than in 2007. Both factors slowed the growth of spending per admission for inpatient care in these hospitals from 8 percent from 2006 to 2007, to about 6 percent from 2007 to 2008.

- In contrast, teaching hospitals outside the Boston metro area saw sustained growth in both spending per day and days per admission. From 2006 to 2008, spending per day in these hospitals grew nearly 17 percent (7 to 9 percent per year), while the number of days per admission grew 5 percent (1 to 4 percent per year). As a result, total spending per admission to teaching hospitals outside the Boston metro area grew 22 percent from 2006 to 2008, compared with 14-percent for Boston area teaching hospitals.
- Spending per patient day (unadjusted for case mix) rose much faster in nonteaching hospitals (22 percent) than in teaching hospitals (16 percent) from 2006 to 2008, reflecting slower growth in spending per inpatient day in Boston metro area teaching hospitals in particular (16 percent). For nonteaching hospitals, patient spending per member year rose somewhat more slowly than for teaching hospitals due only to declining admissions per member year (-3 percent overall, and -7 percent per member year specifically in nonteaching hospitals outside the Boston metro area) and declining days per admission (-1 percent overall).

## 6. High-Cost Inpatient Services

Privately insured patients are admitted to hospitals for many reasons, and no single DRG accounts for a very large share of spending. Taken together, the five DRGs for which total inpatient spending were the greatest accounted for just 9 percent of spending for inpatient care in teaching hospitals in 2008, and 17 percent of spending for inpatient care in non-teaching hospitals (data not shown).

- In 2008, maternity admissions—including both normal deliveries and Cesarean sections—were among the largest sources of spending for inpatient care, accounting for \$51.9 million of spending for inpatient care in teaching hospitals and \$58.7 million of spending in nonteaching hospitals (Figure B.10). Among other DRGs that accounted for significant total spending in teaching hospitals was care on a ventilator for 4 days or longer (\$36.8 million). In nonteaching hospitals, lower joint or limb reattachment, such as knee replacement (\$33.6 million) was among other DRGs that accounted for significant total spending.
- Care on a ventilator and lower joint or limb reattachment were also among the DRGs that accounted for the greatest spending growth from 2007 to 2008 (Figure B.11). In teaching hospitals, other DRGs driving high growth in inpatient spending included cardiac and vascular procedures, as well as autologous bone marrow transplant. In nonteaching hospitals, the increase in spending for inpatient gastric procedures due to obesity (nearly \$5 million) exceeded that for any other single DRG from 2007 to 2008, followed closely by increased spending for lower joint or limb reattachment (such as knee replacement).

## 7. Drivers of Inpatient Spending Growth: Price, Volume, and Intensity

This section provides estimates of the drivers of change in spending 2007, parsing the change in total spending into its component parts: change due to price, change due to volume (the number of admissions), and change due to service mix (hospitalizations for more expensive conditions). To identify what drove the increase in spending per hospital day, we constructed a market basket that included types of hospitalizations (by DRG) that occurred consistently in 2006 and 2007. Estimates for 2008 are not presented, as the absence of some 2008 claims (those incurred but not yet reported) may make comparison with 2007 at this level of detail misleading.

From 2006 to 2007, price increases were the dominant driver of growth in spending for this market basket of inpatient services, for both teaching and nonteaching hospitals. In turn, changes in price may result from any of several potential occurrences, alone or in combination: (1) hospitals may change their prices per DRG; (2) patients may change their use of specific hospitals, which are paid differently for the same DRG; and (3) patients may change health plans, which pay different hospitals different rates for the same DRG. The measure of price developed for this analysis does not parse these potential sources of price change.

- Higher prices explained nearly all of the growth in spending for market-basket inpatient care from 2006 to 2007, offset in part by a shift in service mix to lower-cost DRGs at teaching hospitals and lower admissions to non-teaching hospitals (Table B.5).
- Had the rate of admissions and service mix remained the same as in 2006, price increases from 2006 to 2007 would have driven total expenditure growth of 9 percent (in teaching hospitals) and 10 percent (in nonteaching hospitals) for services in the inpatient market basket, versus the 8.5 percent growth that occurred in teaching and nonteaching hospitals alike.

## 8. Variation in Prices for Inpatient Services

The price that carriers pay for a DRG varies across carriers and, for each carrier, across hospitals. Overall, price variation can be substantial. For example:

- In 2008, the highest price that carriers paid per admission for a gastric procedure for obesity performed in a teaching hospital was more than seven times the lowest price (Figure B.12). In nonteaching hospitals, the average price for the same procedure was lower (about \$12,000, versus more than \$14,000 in a teaching hospital), but the variation in prices was similar.
- For other high-frequency DRGs, the highest price paid generally exceeded the lowest price by a factor of 2 or more.

## **Section C:**

### **Spending for Outpatient Services**

Key findings about spending for outpatient services provided by hospitals and other freestanding facilities<sup>15</sup> are reported below. The spending levels and trends reported in this section represent only facility charges; when billed separately, spending for professional services associated with a hospital or clinic outpatient visit are reported in Section D.

#### **1. Level of Outpatient Spending: Provider and Service Types**

In Massachusetts, acute care hospitals (versus freestanding facilities) provide most outpatient care. Imaging accounts for nearly one fourth of total spending for outpatient services.

- Procedures and imaging services together accounted for more than half of all spending for outpatient care—respectively, 31 percent and 24 percent in 2008 (Table C.1).
- Hospitals provided 92 percent of all outpatient care in 2008, totaling \$3.1 billion. Freestanding facilities provided the remainder (\$255 million).
- Procedures accounted for 31 percent of total spending for hospital outpatient care in 2008, but 73 percent of total spending for services from freestanding outpatient facilities.<sup>16</sup>
- Hospitals provided nearly all imaging services in 2008. Imaging services accounted for 25 percent of spending for outpatient care obtained in hospitals (\$773 million) in 2008, but just 4 percent of spending for care provided in freestanding facilities (\$9 million).

#### **2. Change in Outpatient Spending**

From 2006 to 2008, spending for outpatient care consistently grew faster than spending for inpatient care. Outpatient hospital care accounted for all of this growth, as spending for care in freestanding facilities declined.

- Outpatient spending increased 10 to 11 percent each year, from \$2.7 billion in 2006 to \$3.3 billion in 2008 (Table C.2). Declining spending for care in freestanding facilities (-\$42 million) only partially offset the growth in spending for outpatient hospital care (\$637 million).
- Outpatient spending accelerated from 2007 to 2008, growing 11 percent compared with less than 10 percent from 2006 to 2007. Faster growth in hospital outpatient spending accounted for all of this increase. Spending for hospital outpatient care grew 13 percent from 2007 to 2008, while spending for care at freestanding facilities declined more than 7 percent (about the same rate of decline as in 2007).
- Spending for both procedures and imaging services grew disproportionately fast from 2006 to 2008, so that by 2008 they represented a greater proportion of outpatient spending than



in 2006 (data not shown). Nearly 34 percent of the growth in private insurance spending for outpatient care from 2006 to 2008 was due to greater spending for procedures, while imaging services accounted for 28 percent (Table C.3). Evaluation and management accounted for 11 percent of the growth in outpatient services.

### 3. Average Outpatient Spending

In each year, spending for outpatient care per member year was greater for residents with individual coverage than for residents in either insured or self-insured group plans. However, this difference narrowed from 2006 to 2008.

- On average, Massachusetts residents spent \$1,128 per member year for outpatient services in 2008 (Table C.4). Residents in fully-insured groups spent somewhat less than the average (ranging from \$1,080 for small groups to \$1,124 for large groups), while those in self-insured plans spent more (\$1,185). However, as with inpatient care, residents with individual coverage averaged much higher spending for outpatient care (\$1,428 per member year) than those with group coverage.
- From 2006 to 2007, average outpatient spending increased substantially and at about the same rate in all insurance market sectors. Outpatient spending per member year grew about 9 percent in small groups and self-insured plans, 10 percent for individuals, and nearly 11 percent for medium-sized and large insured groups.
- Average spending (per member year) for outpatient care accelerated from 2007 to 2008, growing 11 to 12 percent in every insurance market sector except in the individual sector. In the individual sector, outpatient spending per member year was approximately stable as enrollment grew nearly 50 percent. As a result, individuals spent 42 percent more per member year for outpatient services than the statewide average in 2006, but just 27 percent more by 2008.

### 4. Components of Growth in Average Outpatient Spending

Growth in outpatient spending per member year was comprised of growth in both average spending per service and the number of services used per member. Changes in average spending per service may reflect changes in the prices paid for any given service, changes in the mix of services, or both.

Growth in both average spending per service and the number of services used per member contributed to growth in spending per member year for outpatient care from 2006 to 2008, overall and in particular as provided by hospitals. In freestanding facilities, the volume of outpatient care declined while average spending per service increased sharply.

- From 2006 to 2008, growth in average spending per outpatient service and growth in the use of services per member contributed about equally to growth in spending per member year for outpatient care, aggregated across hospitals and freestanding facilities (Table C.5).

- Because hospitals deliver most outpatient care in Massachusetts, changes in spending for hospital outpatient care largely drive changes in average spending for outpatient services overall. Average spending per hospital outpatient service grew about 7 percent from 2006 to 2007, slowing to 5 percent from 2007 to 2008. At the same time, growth in the number of hospital outpatient services per member month accelerated sharply—rising 4 percent from 2006 to 2007, and 8 percent from 2007 to 2008.
- The number of outpatient services per member year obtained in freestanding facilities declined nearly 22 percent from 2006 to 2008, while the average expenditure per service grew 8 percent. Because outpatient care provided at freestanding facilities accounts for only a small part of all outpatient spending, these changes had little impact on the overall growth in outpatient spending.
- From 2006 to 2008, spending per service grew faster for evaluation and management services (9 percent) than for any other outpatient service category—including imaging (7 percent), procedures (4 percent), and all other services (3 percent) (Figure C.1). However, the number of evaluation and management services delivered per member year grew very little (about 1 percent) from 2006 to 2008, compared with 5 to 8 percent growth for other outpatient services.

## **5. Differences in Outpatient Spending by Hospital Teaching Status and Service Area**

Teaching hospitals in Massachusetts account for more than half of all spending for outpatient care. Boston-area teaching hospitals account for a large share of this spending, and for most of the growth in outpatient spending from 2006 to 2008.

- In 2008, teaching hospitals provided more than half (54 percent) of hospital outpatient care (Figure C.2). Most spending for hospital outpatient care (45 percent of total outpatient spending) was for care obtained in Boston-area teaching hospitals.
- In 2008, teaching hospitals accounted about half of all spending for evaluation and management services and procedures (54 percent), 47 percent of spending for imaging services, and a 59 percent of spending for other outpatient services. In contrast, nonteaching hospitals accounted for a relatively large share of spending for imaging services (53 percent, compared with 46 percent of hospital outpatient services overall) and a relatively small share of spending for other outpatient services (41 percent).
- Spending for hospital outpatient care grew \$637 million from 2006 to 2008 (Figure C.3). Boston-area teaching hospitals accounted for more than half of this growth (55 percent).
- Spending for outpatient care in Boston-area nonteaching hospitals accelerated from 2007 to 2008. As a result, those hospitals accounted for a substantially larger share of the growth in total spending for outpatient hospital care (16 percent) from 2007 to 2008, than from 2006 to 2007 (11 percent) (Figure C.3a).



- In 2008, average spending per outpatient service (unadjusted for case mix) was highest in Boston-area teaching hospitals (\$156, compared with \$106 for nonteaching hospitals in the Boston area, and \$111 for other teaching hospitals in Massachusetts) (Table C.6).
- In the Boston area, average spending per outpatient service obtained in teaching hospitals grew nearly 21 percent from 2006 to 2008—more than twice as fast as for care obtained in nonteaching hospitals (9 percent). When combined with 13 percent growth in the number of services provided, average spending for outpatient care in Boston-area teaching hospitals grew 36 percent from 2006 to 2008. Average outpatient spending in nonteaching hospitals in the Boston area grew 22 percent.
- From 2006 to 2008, average spending (per member year) for hospital outpatient care outside the Boston area grew 20 to 21 percent—about equal to the growth in spending for care in Boston area nonteaching hospitals (22 percent). While average spending per service in non-Boston hospitals grew relatively slowly (6 to 7 percent) from 2006 to 2008, the number of services delivered per member year grew 12 to 14 percent—faster than in Boston-area hospitals, whether teaching (13 percent) or nonteaching (11 percent).
- Average outpatient spending (per member year) in teaching hospitals outside the Boston area grew much faster from 2007 to 2008 (12 percent) than from 2006 to 2007 (8 percent). The faster growth of average spending in teaching hospitals compared with nonteaching hospitals outside the Boston area reflected faster growth in average spending per service.

## 6. High-Cost Outpatient Services

Although no single service accounted for a large proportion of the total growth in spending for outpatient services in any year, in several service categories spending increased very fast:

- Digital mammography imaging services accounted for \$14.8 million of the growth in outpatient hospital services in 2008 (Figure C.4). The next largest sources of growth in spending for outpatient services were injections of either of two cancer-treating drugs—bevacizumab (Avastin) and trastuzumab (Herceptin)—together accounting for \$11.7 million of the increase in total spending for outpatient services in 2008.
- Diagnostic procedures—including colonoscopy and upper-GI endoscopy—contributed significantly to growth in total outpatient spending in freestanding clinics in 2008. Cataract removal and evaluation and management services also were among the largest sources of growth in expenditure for outpatient care obtained in freestanding clinics.

## 7. Drivers of Total Outpatient Spending Growth: Price, Volume, and Intensity

Similar to the analysis of inpatient spending growth in Section B, we produced a market basket of the outpatient services that were delivered in 2006 and 2007 in order to measure the separate impacts of changes in price, volume, and service mix on the growth in spending for outpatient care. As with our analysis of inpatient spending, changes in price may result from any or all of three

potential changes: (1) providers may change the price of any given service; (2) patients may change their use of providers, who may be paid a different price for the same service; and (3) patients may change health plans, which may pay different providers different prices for the same service.

- Both higher prices and greater volume of services drove outpatient spending growth from 2006 to 2007, while service mix gravitated to lower-cost services (Table C.7).
- Because the additional volume was comprised of services that on average were less expensive, the net impact on spending was less than it otherwise would have been. The combined impact of greater volume and less costly service mix contributed 5 percentage points to the 12 percent growth in total outpatient spending that actually occurred. In contrast, had volume and service mix remained unchanged from 2006 to 2007, higher prices alone would have driven a 7-percent increase in total spending for outpatient care from 2006 to 2007.

## **8. Variation in Prices for Outpatient Services**

As with inpatient services, the prices that carriers pay for outpatient services vary across carriers and, for each carrier, across providers. The resulting price variation can be substantial. For example:

- For surgical arthroscopy of the shoulder obtained in a hospital, the highest price paid in 2008 was 19 times the lowest price paid (\$6,303 versus \$334) (Figure C.5). Prices paid for a cholecystectomy (gallbladder removal) varied nearly 18 to 1 (\$6,686 versus \$379). For these services obtained in freestanding clinics, the variation in prices was similarly high.

## Section D:

# Spending for Physician and Other Professional Services

Key findings with respect to the change in spending for physician and other professional services from 2006 to 2008 are reported below. Physicians and other professionals include medical specialists, primary care physicians, and other medical professionals.<sup>17</sup> Note that the estimates exclude payments for facility charges if billed separately; these expenses are reported in Sections B and Section C.

### 1. Level of Spending for Professional Services: Insurance Market Sectors and Service Types

In 2008, more than half of all spending for physician and other professional services were for care provided by medical specialists.

- In 2008, 54 percent of total spending for physician and other professional services was for specialty care; 31 percent was for primary care (Figure D.1).
- Insured health plans—including both individuals and insured groups—accounted for more than half (56 percent) of total spending for physician and other professional services in 2008 (Figure D.2). Small group and individual health plans together accounted for about 22 percent, while insured large and medium-sized group plans accounted for 15 percent and 19 percent, respectively. Self-insured plans accounted for 44 percent of total spending for physician and other professional services.

### 2. Change in Spending for Physician and Other Professional Services

Total spending for professional services grew 18 percent from 2006 to 2008. Payments for specialty care accounted for about half of the increase in spending for professional services each year.

- Total spending for physician and other professional services grew 8 percent from 2006 to 2007, and 9 percent from 2007 to 2008 (Figure D.3). Cumulatively, total spending for these services grew 18 percent from 2006 to 2008.
- Higher payments to specialists accounted for about half of the growth in total spending for physician and other professional services from 2006 to 2007 (50 percent) and also from 2007 to 2008 (48 percent) (Figures D.4 and D4a).
- Primary care providers accounted for about one third (31 percent) of the overall growth in expenditures for physician and other professional services from 2006 to 2008. However, primary care providers received a smaller share of the growth in total spending for physician and other professional services from 2007 to 2008 (28 percent) than from 2006 to 2007 (37 percent). Moreover, the increase in total spending for primary care from 2007 to 2008

(\$100.7 million) was, in dollar terms, less than the increase from 2006 to 2007 (\$113.3 million).

- In contrast, other (non-physician) medical professionals accounted for 13 percent of the growth in spending for professional services from 2006 to 2007 (\$40.0 million), and nearly 25 percent of the growth in spending from 2007 to 2008 (\$89.4 million).

### **3. Average Spending for Physician and Other Professional Services**

Similar to their higher cost for inpatient and outpatient services, individually insured residents incurred higher average (per member year) spending for physician and other professional services, compared with residents in either insured or self-insured groups. However, average spending for individually insured residents grew much more slowly than for group-insured residents from 2007 to 2008, substantially reducing the difference in average spending in 2008 among market sectors.

- From 2006 to 2008, residents with individual coverage spent more per member year for professional services than residents in either insured or self-insured groups (Table D.1). In 2008, individually insured residents spent \$1,716 per member year for professional services, compared with \$1,397 in small groups and \$1,368 in medium-sized groups. Among residents in group coverage, average spending for physician and other professional services was greatest in insured large groups (\$1,474) and in self-insured plans (\$1,554).
- Average spending for physician and other professional services (per member year) grew 19 percent from 2006 to 2008. Insured large groups and self-insured plans posted the fastest growth in average spending for professional services—about 20 percent from 2006 to 2008. Average spending in small and medium-sized insured groups grew more slowly, about 17 percent.
- Compared with insured and self-insured groups, insured individuals saw relatively little spending growth for physician and other professional services from 2006 to 2008—less than 10 percent. For insured individuals, average spending for these services grew much more slowly from 2007 to 2008 (3 percent) than from 2006 to 2007 (6 percent), as enrollment in individual coverage grew. As a result of this much slower growth in spending, the difference in average spending for physician and other professional services between residents with individual coverage and those in small groups narrowed: while individuals spent, on average, 31 percent more for physician and other professional services than small groups per member year in 2006, by 2008 they spent 23 percent more.

### **4. Components of Growth in Average Spending for Physician and Other Professional Services**

From 2006 to 2008, spending per member year for other (non-physician) professional services grew much faster than spending for either specialty or primary care, reflecting faster growth in both

average spending per service (unadjusted for case mix) and the number of services provided per member year.

- Average spending (per member year) for primary care grew nearly 20 percent from 2006 to 2008 (Table D.2). From 2007 to 2008, somewhat slower growth in average spending for primary care (9 percent, compared with 10 percent the year before) reflected slower growth in both spending per service and the number of services provided per member year.
- In contrast, average spending for other (non-physician) professional services grew nearly 26 percent from 2006 to 2008, fueled by 12-percent growth in both average spending per service and the number of services provided. Average spending for other professional services accelerated from 2007 to 2008, growing nearly 17 percent (compared with 8 percent growth from 2006 to 2007). Both spending per service and the number of services provided per member year grew faster from 2007 to 2008 than in the prior year.
- Average spending for specialty care grew 17 percent from 2006 to 2008—reflecting 4 to 5 percent growth in spending per service each year, and 2 to 4 percent annual growth in the number of services provided per member year.
- From 2006 to 2008, both self-insured groups and insured large groups saw a 20-percent increase in average spending for physician and other professional services, compared with a 17-percent increase for insured small and medium-sized groups (Table D.3). While average spending per service grew at about the same rate for all group plans, whether insured or self-insured (9 percent from 2006 to 2008), the number of services provided per member year grew much faster in insured large groups and self-insured plans (10 percent) than in small and medium-sized groups (6 to 7 percent).
- Among individuals enrolled in non-group coverage, average spending for physician and other professional services grew less than 10 percent from 2006 to 2008. Average spending per service grew more slowly (8 percent) than for insured or self-insured groups (9 to 10 percent), while the number of services provided per member year grew just 1 percent—reflecting 3-percent growth from 2006 to 2007, and a 2-percent decline in the number of services per member year from 2007 to 2008.

## **5. High-Cost Physician and Other Professional Services**

Evaluation and management (E&M) services and individual psychotherapy are major components of spending for physician and other professional services, and they account for substantial expenditure growth.

- In 2008, spending for the seven highest-expenditure E&M services totaled \$934.9 million (Figure D.5). Individual psychotherapy, routine obstetric care (vaginal delivery), and surgical pathology (gross and microscopic examination) also represented high total spending for professional services in 2008.

- In 2008, spending for E&M services for low or moderately complex patients, followed by spending for individual psychotherapy, grew more than spending for any other major professional service category (Figure D.6). Together, E&M services for low or moderately complex patients grew \$71.3 million, while other major categories of E&M services—including office consultations, ER visits, and preventive services—grew \$18.7 million. Spending for individual psychotherapy grew \$32.0 million.

## 6. Drivers of Growth in Spending for Physician and Other Professional Services: Price, Volume, and Intensity

Similar to the analysis of drivers of spending growth for inpatient and outpatient services in earlier sections, we developed a market basket of physician and other professional services provided in 2006 and 2007 to explore drivers of change. In effect, higher prices drove all of the increase in spending for these services from 2006 to 2007. While the volume of services also increased, service mix migrated toward less costly services, fully offsetting the cost impact of higher volume.

- Higher prices were the major driver of higher expenditures for professional services in 2007. Had prices remained at 2006 levels, the combined change in volume and service mix would have reduced total spending for professional services in the market basket (compared with actual spending growth of about 8 percent) (Table D.4).

## 7. Variation in Prices for Physician and Other Professional Services

Prices for physician and other professional services vary across carriers and providers, resulting in wide disparities in prices for the same service. For example:

- In 2008, the highest price for an E&M visit for a moderately complex patient was 3 times the lowest price paid (\$220 versus \$64) (Figure D.7). Insurer payments for other services such as individual psychotherapy visits and E&M visits for low-complexity patients also varied widely.



## **Section E:**

### **Spending for Imaging Services**

Recent trends in spending for imaging services are reported below—including both outpatient facility charges and separately billed physician charges. Inpatient facility charges for imaging services provided during a hospital stay are not included, as DRG payments (reported as inpatient spending in Section B) typically include such charges.

#### **1. Level of Spending for Imaging Services by Provider and Service Type**

Spending for imaging services—including facility charges and physician and other professional services charges totaled more than 9 percent of all spending for health care in 2008. Facility charges—nearly entirely from acute care hospitals—accounted for about two-thirds of all spending for imaging services. Standard imaging accounted for about one third of spending for imaging services.

- Total spending for imaging services—including facility charges and physician and other professional services charges—exceeded \$1.2 billion in 2008 (Figure E.1). Imaging services accounted for more than 9 percent of the estimated \$12.9 billion that residents spent for privately insured health care in 2008.
- Facility charges accounted for nearly two-thirds (64 percent) of all spending for imaging services in 2008—totaling nearly \$783 million (excluding professional charges that may include additional facility charges not billed separately). Acute-care hospitals accounted for nearly all facility charges for imaging services (99 percent or \$773.5 million). Charges for physician and other professional services associated with imaging totaled \$431.6 million in 2008.
- Standard imaging accounted for 35 percent of total spending for imaging services (including both professional and facility charges) in 2008, followed by MRIs (22 percent), CAT scans (20 percent), and echography/ultrasound (20 percent, Figure E.2).
- As might be expected, specialists (versus primary care physicians) provided more than 90 percent of professional imaging services—including nearly 100 percent of CAT scans and MRIs in 2008 (data not shown). Compared with other imaging services, echography/ultrasonography was least likely to be provided (81 percent) by a specialty physician.

#### **2. Annual Change in Spending for Imaging Services by Service Type**

Spending for imaging services grew faster than spending for all health care in both 2007 and 2008. Over both years, from 2006 to 2008, total spending on imaging services grew 21 percent. Somewhat slower growth in spending from 2008 than in 2007 reflected slower growth in charges for both professional services and hospital outpatient facilities. Nevertheless, in both years, facility costs grew about twice as fast as the cost of professional services.

- Spending for imaging services increased 21 percent from 2006 to 2008—more than 11 percent in 2007 and another 9 percent in 2008 (Figure E.1). In both years, spending for imaging services grew much faster than spending for all privately insured health care (7.5 percent).
- From 2006 to 2008, spending for facility charges grew more than twice as fast as spending for professional services related to imaging. Payments to facilities—nearly all outpatient hospital facilities—grew 27 percent over the two-year period: 15 percent from 2006 to 2007 and another 11 percent from 2007 to 2008 (Table E.1). Spending for professional services charges grew much more slowly: 13 percent from 2006 to 2008, or approximately 6 percent per year.
- Reflecting the much faster growth of outpatient facilities charges for imaging services, facilities charges accounted for a growing share of total spending for imaging: 65 percent in 2008, compared with 62 percent in 2006.
- Spending for standard imaging services (the largest single component of imaging expenditures) grew 25 percent from 2006 to 2008, with slower growth from 2007 to 2008 (8 percent) than the prior year (16 percent) (Figure E.3). Total spending also grew substantially for echography/ultrasound (24 percent from 2006 to 2008) and for MRIs (23 percent). From 2007 to 2008, spending for MRIs accelerated sharply, growing more than 14 percent that year.
- Standard imaging accounted for 40 percent of the overall increase in total spending for imaging services from 2007 to 2008, but nearly half of the annual growth in spending for imaging services from 2006 to 2007 (Figures E.4 and E.4a). Spending for MRIs accounted for 23 percent of the growth in total spending for imaging services from 2006 to 2008, but fully one third (33 percent) of the growth from 2007 to 2008.

### **3. Components of Growth in Average Spending for Imaging Services**

Growth in both spending per service and the number of services per member year drove higher spending for imaging services from 2006 to 2008. Both components contributed to the faster growth of spending for facilities than for physician and other professional services associated with imaging services.

- From 2006 to 2008, 14-percent growth in spending per service (unadjusted for case mix) and 12-percent growth in the number of services per member year drove 27-percent growth of payments to outpatient facilities for imaging services (Table E.2). (Recall that nearly all of these payments were made to hospital outpatient facilities.) Growth in both components slowed from 2007 to 2008, but spending per service continued to grow faster (6 percent) than the number of services per member year (5 percent).
- Average spending (per member year) for facility charges related to standard imaging services grew 37 percent from 2006 to 2007, faster than growth for any other type of imaging services. Much of this high growth was related to very fast growth in spending per service



from 2006 to 2007 (17 percent). Growth spending per standard imaging service fell to 5 percent from 2007 to 2008.

- From 2006 to 2008, the number of MRIs performed in outpatient facilities per member year grew 36 percent—15 to 17 percent per year. However, spending per service (unadjusted for case mix) declined (-4 percent), suggesting that many of the additional services entailed lower charges. However, both spending per service and the number of services per member year grew (4 percent and 16 percent, respectively) from 2007 to 2008, driving 20-percent growth in spending per member year.
- Compared with outpatient facility charges for imaging, spending per member year for physician and other professional services related to imaging grew relatively slowly from 2006 to 2008, about 13 percent (Table E.3). Spending per imaging service grew 5 percent from 2006 to 2008, while the number of services per member year grew 8 percent.

#### 4. High-Cost Imaging Services

Digital (as opposed to film) mammography was a major component of the growth in spending for imaging services.

- Spending for screening digital mammography grew \$21 million from 2007 to 2008, accounting for 21 percent of the growth in total spending for imaging services in 2008 (Figure E.5).
- Growth in spending for diagnostic digital mammography (unilateral or bilateral) accounted for an additional 6 percent (\$5.5 million) of the growth in total spending for imaging services.

#### 5. Drivers of Imaging Expenditure Growth: Price, Volume, and Intensity

Similar to the analysis in earlier sections, we developed a market basket of the imaging services provided in 2006 and 2007 in order to parse the independent effects of changes in price, volume, and intensity on spending for imaging services. This market basket included about 80 percent of total spending for imaging services each year. Again, changes in price may result from any or all of three potential changes: (1) providers may change the price of any given imaging service; (2) patients may change their use of providers, who may be paid a different price for the same imaging service; and (3) patients may change health plans, which may pay different providers different prices for the same imaging service.

While price increases were a major driver of growth in spending for imaging services in 2007, other factors were as important in driving spending growth. In 2007, growth in the volume of imaging services contributed strongly to spending growth, even adjusted for a slight movement toward a less costly service mix.

- Higher prices accounted for nearly half of the growth in total spending for imaging services from 2006 to 2007 (Table E.4). If the volume and mix of services had remained constant, changes in price alone would have increased spending for imaging services by 6 percent—compared with actual growth of 13 percent.
- Notwithstanding the importance of price in driving the growth of imaging services, increased volume of services also contributed significantly to greater spending for imaging in 2007. However, this effect was mitigated by a migration of the service mix to slightly less costly services.

## **6. Variation in Prices for Imaging Services**

For imaging procedures that accounted for the highest total spending, prices varied among carriers, facilities, and physician providers. For example:

- The highest price paid for digital mammography for screening (\$407) was more than three times the lowest price paid (\$130) in 2008 (Figure E.6). Professional charges for digital mammography similarly varied 3 to 1, ranging from \$30 to \$105 in 2008.
- Facility price differentials for various other major services were even greater. Facility charges for a CT scan of the abdomen varied from \$121 to \$1,808 in 2008. Facility charges for an MRI of a lower extremity joint varied similarly.

## **Section F: Efficiency:**

### **30-Day All-cause Hospital Readmissions**

High rates of hospital readmissions in Massachusetts and other states represent potentially significant problems of health care quality as well as avoidable cost.<sup>18</sup> An earlier report to DHCFP estimated rates of potentially preventable readmissions (PPR) in Massachusetts among commercial and HMO payers in 2005-2006, ranging from about 7.5 percent to nearly 9 percent.<sup>19</sup> The discussion below extends this work, evaluating readmission rates in 2007 overall and for 5 medical and 5 surgical DRGs associated with high rates of readmissions. However, but by necessity, the analysis is much simpler, using unadjusted rates of all-cause readmissions for medical and surgical DRGs within 30 days.<sup>20</sup>

Unadjusted rates of all-cause hospital readmission in 2007 and physician visits within 30 days (or between discharge and readmission, whichever came first) are reported below for medical and surgical admissions reported by three carriers.<sup>21</sup> We limited the sample to the three carriers using AP DRGs to be able to examine which medical and surgical DRGs had the highest rates of readmission. Because the analysis includes data from only three carriers and excludes maternity DRGs, admissions to out-of-state hospitals, and admissions for which the discharge date was missing, the number of admissions and expenditure amounts reported in this section differ from those presented in Section B.

#### **1. Rates of Readmissions and Average Cost**

About 7 percent of medical and surgical hospitalizations in 2007 resulted in at least one readmission. Readmissions and spending per member year were higher for medical DRGs than surgical DRGs, and higher in teaching than in non-teaching hospitals.

- About 8 percent of privately insured patients hospitalized for a medical DRG were readmitted within 30 days, either related to the initial hospitalization or otherwise (Table F.1). Among privately insured patients hospitalized for a surgical DRG, nearly 6 percent were readmitted within 30 days. Patients admitted to teaching hospitals had higher rates of readmissions for both medical and surgical DRGs compared with patients admitted to non-teaching hospitals.
- Readmissions accounted for 9 percent of total spending for hospital care for medical and surgical DRGs, equal to approximately \$49 per member year. Medical readmissions accounted for the most of this amount—\$32, compared with approximately \$17 for surgical readmissions (Table F.2).
- Readmissions to teaching hospitals accounted for 63 percent of the cost pmpm of readmissions for either surgical or medical DRGs—including 60 percent of the cost of medical DRGs and 68 percent of the cost of surgical DRGs (Table F.2).

## 2. Medical and Surgical DRGs with High Readmission Rates<sup>22</sup>

### DRG Type and Reasons for Readmissions

- All-cause readmissions corresponded to a wide range of index-admission DRGs. Taken together, the 5 medical and surgical DRGs with the highest readmission rates accounted for more than 9 percent of all readmissions (Table F.3).
- The 5 medical DRGs with the highest rates of readmissions included digestive, circulatory, cardiovascular, and respiratory diseases. These DRGs represented 6 percent of all medical index admissions and 8 percent of all medical readmissions (Table F.3). Ten to 46 percent of readmissions were for the same medical DRGs as the index hospitalization (Table F.4).
- The 5 surgical DRGs with the highest rates of readmissions included brain surgery, vascular procedures, stomach and bowel procedures, and major musculoskeletal procedures. These DRGs represented 6 percent of all surgical index admissions and 12 percent of surgical readmissions (Table F.3). Readmissions for these DRGs were less likely to be for the same DRG as the index admission: 6 to 16 percent of readmissions were for the same surgical DRGs as the index hospitalization (Table F.4).

### Average Expenditures

- The 5 medical and surgical DRGs with the highest readmission rates together accounted for low spending per member year (about \$5) (Table F.5). More than 70 percent of this amount, for both medical and surgical DRGs, was related to readmissions to teaching hospitals.

### Physician Visits Following Hospitalization

- Patients who were readmitted within 30 days were less likely to have seen a physician following discharge than patients who were not readmitted. Among all medical and surgical DRGs, 66 percent of patients who were readmitted saw a physician following discharge, compared with 73 percent of patients who were not readmitted. Similarly among the top 5 medical and surgical DRGs, 65 percent of patients who were readmitted saw a physician following discharge, compared with 79 percent of patients who were not readmitted (Table F.6).
- Patients with medical DRGs were less likely to see a physician when discharged from a teaching hospital than from a non-teaching hospital. In contrast, patients with surgical DRGs were more likely to visit a physician when discharged from a teaching hospital than from a non-teaching hospital. These patterns were apparent regardless of whether the patient was rehospitalized.

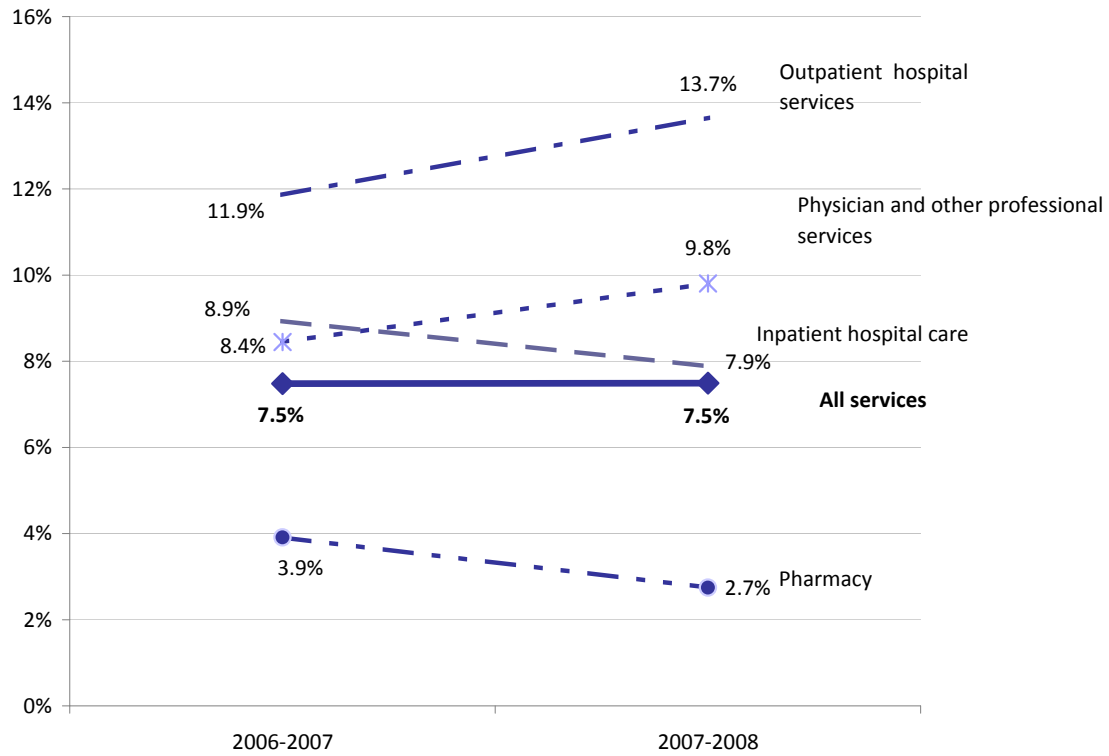
## Endnotes

- <sup>1</sup> Centers for Medicaid & Medicare Services (CMS) [available at: <http://www.cms.hhs.gov/NationalHealthExpendData/downloads/proj2008.pdf>].
- <sup>2</sup> U.S. Department of Commerce, Bureau of Economic Analysis [<http://www.bea.gov/regional/spi/action.cfm>].
- <sup>3</sup> The carriers included most or all claims for services covered under capitation arrangements in their claims data. Because diverse service types may be provided in a capitation arrangement, carriers valued capitated services at their fee-for-service equivalent to support analysis of capitated claims by service type; these fee-for-service equivalents for capitated services are included throughout the analysis. We calculated a “capitation adjustment” for each carrier, equal to the difference between the carrier’s reported total capitation payments and the sum of the fee-for-service equivalents for capitated services. Capitation adjustments (that is, capitation payments net of estimated fee-for-service equivalent expenditures for services provided under capitation arrangements) are reported in the overview section. However, due to the level of aggregation with which capitation payments are reported, capitation adjustments are not reported by service type.
- <sup>4</sup> When employer plans “carve out” prescription drug coverage, the benefit is either insured or self-insured separately. If insured, another carrier writes a separate drug plan; when self-insured, the benefit may be administered by a pharmacy benefit manager, or PBM. An explanation of methods used to estimate claims incurred but not yet paid, as well as “carve out” expenditures for prescription drugs is provided in the methods appendix.
- <sup>5</sup> An earlier study of cost trends among enrollees in insured HMO company products (excluding some carriers as well as self-insured employer plans) found that expenditure growth pmpm in Massachusetts slowed from 2002 to 2006, from a 12-percent increase in expenditures pmpm in 2003 to 10- to 11-percent growth in both 2005 and 2006. See: Beth Fritchen, Kurt Giesa, and Charlie Louters, Trends in Health Claims for Fully-Insured Health Maintenance Organizations in Massachusetts, 2002-2006. Report to the Health Care Access Bureau of the Massachusetts Division of Insurance. Milwaukee, WI: Oliver Wyman, September 15, 2008 [available at <http://www.mass.gov/Eoca/docs/doi/Consumer/MAHMO-TrendReport.pdf>].
- <sup>6</sup> Other, non-physician professionals include (but may not be limited to) nurses other than primary care providers, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, and dentists.
- <sup>7</sup> Net enrollment in the largest carriers’ insured groups declined by about 106,400 lives from 2006 to 2008, while net enrollment in self-insured groups and individual contracts increased by about 97,300 and 24,700 lives, respectively. Note that the number and distribution of covered lives reported here may vary from that reported in Welch and Giesa (2009); this report includes claims reported only for Massachusetts residents, while Welch and Giesa report premiums based on all lives (in or out of state) covered by Massachusetts carriers.
- <sup>8</sup> Nationally, the percentage of workers with a deductible of \$1,000 or more for single coverage increased from 10 percent in 2006 to 18 percent in 2008. Workers in small firms (with 3 to 199 workers) were more likely to have a general annual deductible of \$1,000 or more for single coverage (35 percent) than workers in larger firms (9 percent). While the percentage of workers in large firms with high deductibles did not increase significantly, the proportion of workers in small firms with deductibles of \$1,000 or more grew from 16 percent in 2006 to 35 percent in 2008. See: The Kaiser Family Foundation and Health Research & Educational Trust, Employer Health Benefits: 2008 Annual Survey [available at: <http://ehbs.kff.org/pdf/7790.pdf>].
- <sup>9</sup> The reduction in cost sharing in self-insured and large group plans probably reflects either no adjustment in benefit design or adjustments that did not keep pace with expenditure trends. Conversely, greater cost sharing in individual plans and for small and medium-sized groups apparently reflects increased deductibles (including new enrollment in high-deductible health plans), copayments, and/or coinsurance that exceeded expenditure trends.
- <sup>10</sup> By increasing the marginal cost of service use to the patient, greater cost sharing is widely believed to reduce total expenditures for health care. Seminal research estimating the magnitude of this relationship was conducted in the 1970s (see: J.P. Newhouse, W.G. Manning, C.N. Morris, et al., 1981. Some Interim Results from a Controlled Trial of Cost Sharing in Health Insurance. *New England Journal of Medicine* 305:1501-1507). More recent analyses of the impact of high-deductible health plans (HDHPs) on total expenditures focus on experience when those plans are coupled with a health savings account (for example, see: J.B. Christianson, et al., August 2004. “Consumer Experiences in a Consumer-Driven Health Plan,” *Health Services Research*, 39:4 Part II). These results, however, probably understate the impact of HDHPs on health services use and expenditures among middle- and low-income families (who are much less likely to elect an HDHP when offered a choice) and if employers do not also fund a health savings account. In 2009, twelve percent of firms offering health benefits offered an HDHP with a health reimbursement account (2 percent) or an HDHP that qualified for a health savings account, or HSA (10 percent)—about the same rates of offer as in 2008. Of those that offered an HSA-qualified HDHP, 29 percent made no employer contribution to the HSA (see: Kaiser Family Foundation, Employer Health Benefits 2009 Annual Survey [available at: <http://ehbs.kff.org>]). A comprehensive review of the research literature estimating the relationship between cost sharing and health services use and expenditures is provided in: S. Liu and D. Cholle, 2006. “Price and Income Elasticity of the Demand for Health Insurance and Health Care Services: A Critical Review of the Literature” [available at: <http://www.mathematica-mpr.com/publications/PDFs/priceincome.pdf>].
- <sup>11</sup> See Massachusetts Health Care Trends Part I: Private Health Insurance Premium Trends 2006-2008, Figure 2A.3.
- <sup>12</sup> In individual plans, spending for inpatient maternity care increased 17 percent in 2008.

- <sup>13</sup> The number of live births in Massachusetts was approximately 3 percent lower in 2006 (the most recent data available) than in 2003 (<http://wonder.cdc.gov>). The greatest decline occurred in preterm births, with gestation of fewer than 35 weeks. Slowing growth in maternity expenditures in 2008 was generally consistent with a continuation of these trends, as well as changes in enrollment and the demographic composition of privately insured residents.
- <sup>14</sup> This distribution of expenditures between teaching and nonteaching hospitals is consistent with a greater number of admissions to teaching hospitals. Conversely, among public payers in Massachusetts, nearly 60 percent of admissions are to community hospitals rather than teaching hospitals (Division of Health Care Finance and Policy analysis of inpatient discharge data, unpublished).
- <sup>15</sup> Freestanding facilities include ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities. Outpatient hospital care includes all ambulatory care services provided by an acute care hospital, including emergency room (ER) visits.
- <sup>16</sup> Types of service are based on the BETOS grouper, which classifies claims based on CPT code. The procedure category includes major procedures (such as hip or knee replacement) as well as minor or ambulatory procedures, endoscopies, dialysis, and radiation therapy.
- <sup>17</sup> Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists include all other MDs. Other professionals include all other nurses, as well as midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, and other nonphysician medical professionals.
- <sup>18</sup> A number of studies have pointed to improvements in care coordination at hospital discharge, with appropriate follow-up care either in a post-acute facility or in the community, as promising ways to avoid rehospitalization. For example, see: Coleman et al. The Care Transitions Intervention: Results of a Randomized Controlled Trial. *Archives Internal Medicine* 2006; 166 (17): 1822-28.
- <sup>19</sup> Division of Health Care Finance and Policy, Potentially Preventable Readmissions, 3M Methodology report, unpublished.
- <sup>20</sup> The 3M report included only hospitalizations that were likely to be preventable and readmissions that were plausibly related to the initial hospitalization. In addition, 3M adjusted for case-mix and severity of illness by DRG.
- <sup>21</sup> Admissions for maternity and newborn care are excluded from the analyses, as are any admissions with unknown or missing DRG data.
- <sup>22</sup> We identified medical and surgical DRGs with high readmission rates among the 30 most frequent medical and surgical DRGs overall. Among these most frequent 30 medical and surgical DRGs, we then identified the 5 DRGs with the highest readmission rates.

## **Tables and Figures**

**Figure A.1: Annual Rate of Growth in Spending per Member Year by Type of Service, 2006-2008**



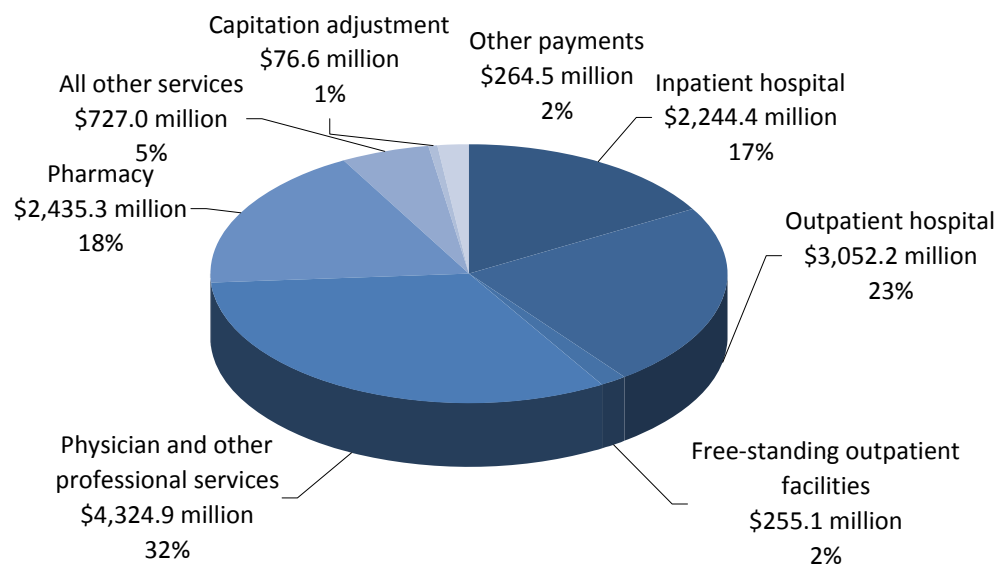
Sources: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Note: Data reflect reporting carriers' insured and self-insured business.



**Figure A.2: Distribution of Total Spending for Privately Insured Health Care in  
Massachusetts,  
by Type of Service, 2008**

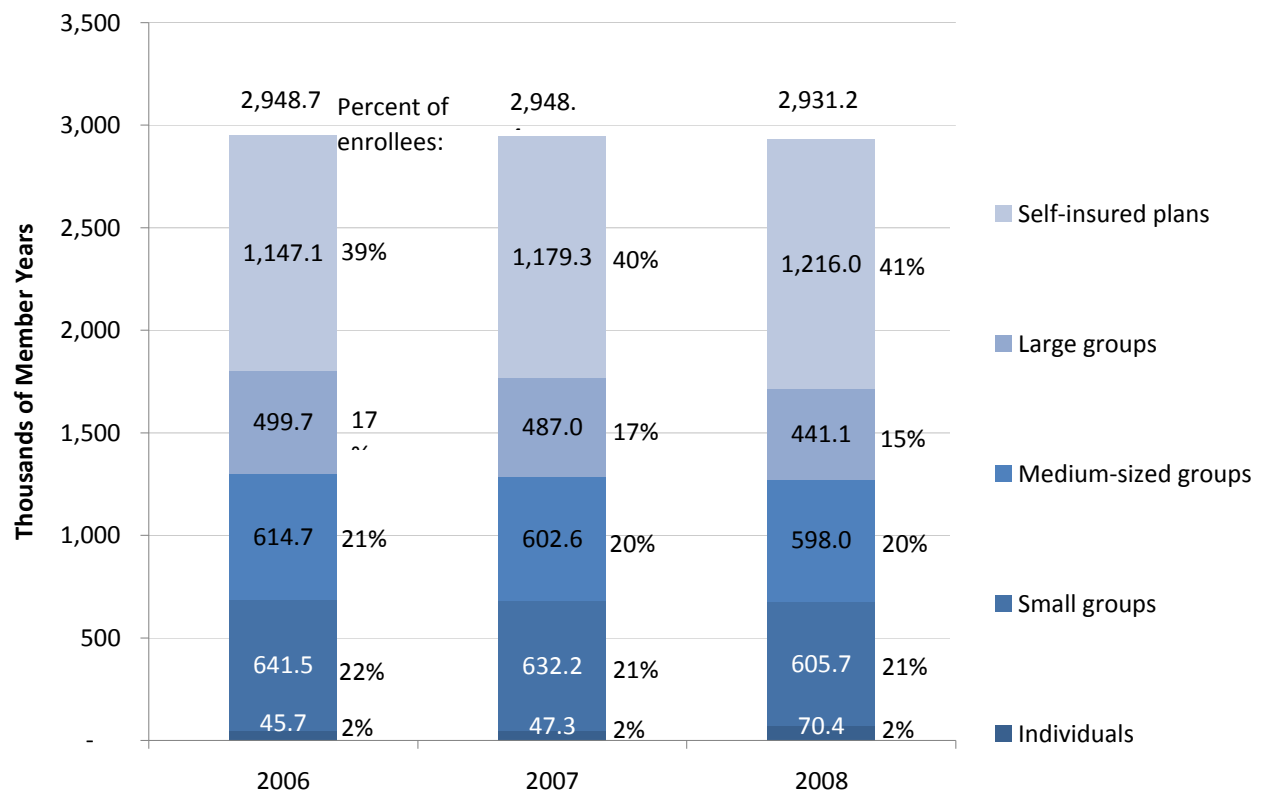
**Total: \$13.0 billion**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Inpatient and outpatient facility expenditures exclude professional services billed separately. "All other services" includes skilled nursing facilities, non-acute institutional care, and other unclassified claims. Capitated claims are valued at the fee-for-service equivalent. The capitation adjustment reconciles total capitation payments and the fee-for-service equivalents that carriers reported at the claims level; other reported payments include pay-for-performance incentive payments and network management fees that did not flow through the claims system.

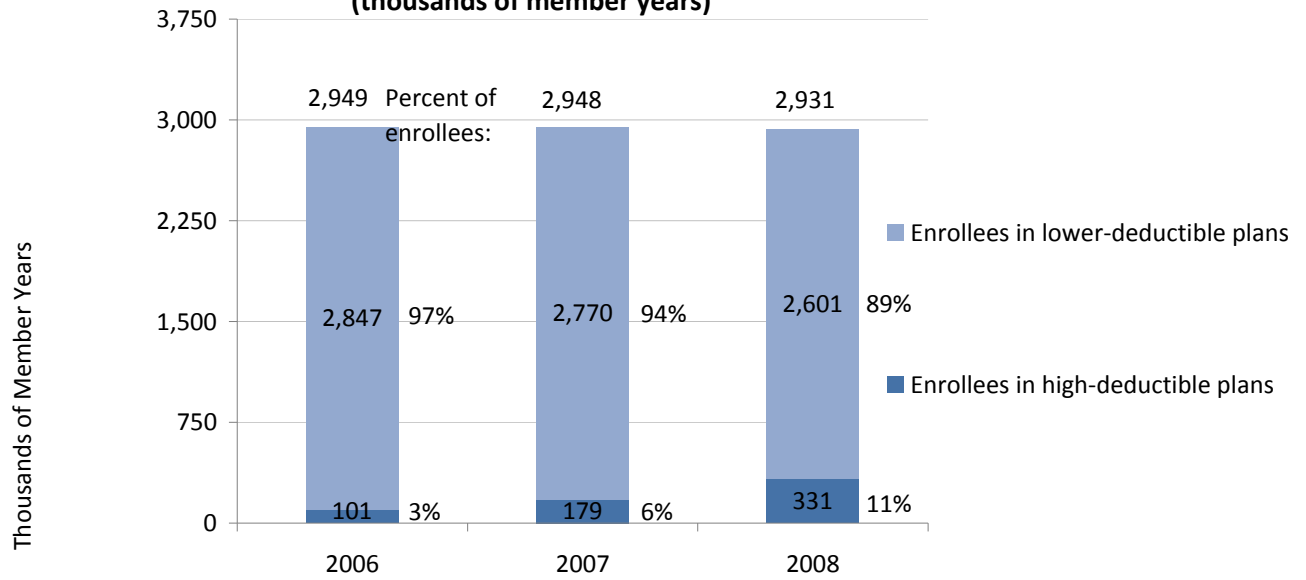
**Figure III.A.3: Total Resident Enrollment by Private Insurance Market Sector, 2006-2008  
(thousands of member years)**



Source: Mathematica Policy Research analysis of enrollment data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: A small group is an “eligible small business or group” defined per Massachusetts Division of Insurance Regulation 211 CMR 66.04; employers that have fewer than 51 enrollees but do not meet the definition of an eligible small employer are included as a medium-sized group, together with employers with 51-499 enrolled employees; large groups include employers with 500 or more enrolled employees.

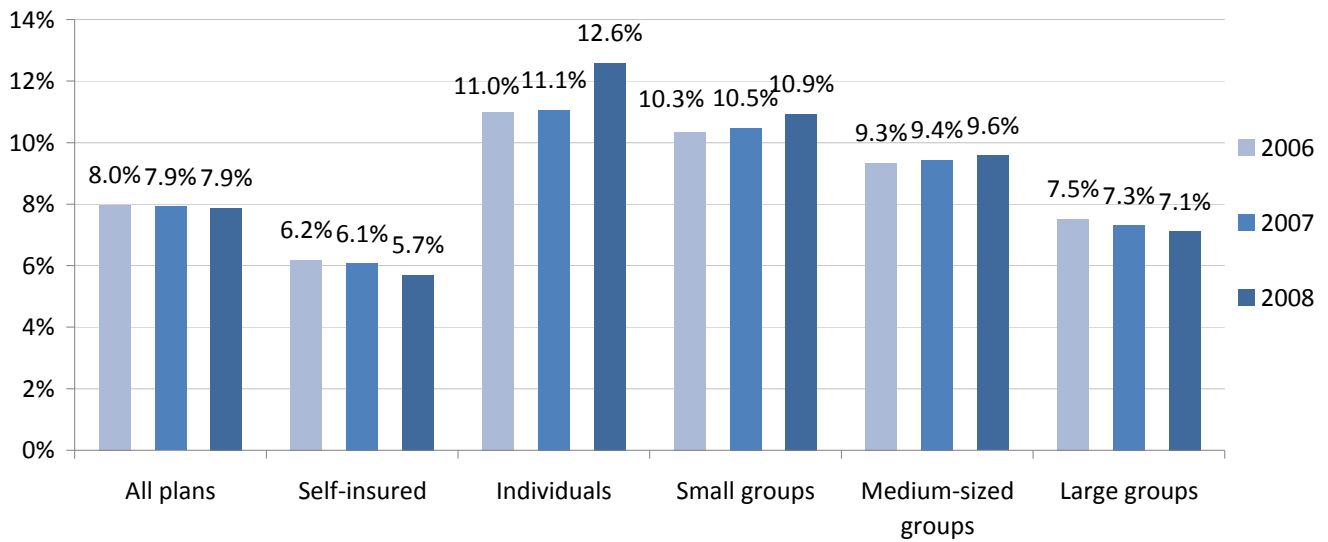
**Figure III.A.4 Enrollment in High-Deductible Plans, 2006-2008**  
(thousands of member years)



Source: Mathematica Policy Research analysis of enrollment data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Note: High-deductible plans are plans with a deductible above \$1,000.

**Figure A.5: Consumer Cost Sharing as a Percent of Total Spending for Insured Services  
by Insurance Market Sector, 2006-2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Cost sharing includes deductibles, coinsurance amounts, and copayments, but do not include consumer (or employee contributions to) premiums. Capitated claims and claims with third party payers are excluded.

**Table A.1 Total Spending, Spending per Member Year, and Rates of Change, 2006-2008**

				Percent change:		Total change 2006-
	2006	2007	2008	2006-2007	2007-2008	2008
<i>Total expenditures (in millions):</i>						
All services	\$11,650	\$12,520	\$13,380	7.5%	6.9%	14.8%
Inpatient hospital care	\$1,921	\$2,093	\$2,244	8.9%	7.3%	16.8%
Outpatient services	\$2,712	\$2,977	\$3,307	9.8%	11.1%	22.0%
Outpatient hospital	\$2,415	\$2,701	\$3,052	11.8%	13.0%	26.4%
Other outpatient facilities	\$297	\$275	\$255	-7.2%	-7.4%	-14.0%
Physician and other professional services	\$3,654	\$3,962	\$4,325	8.4%	9.2%	18.4%
Pharmacy	\$2,295	\$2,384	\$2,435	3.9%	2.1%	6.1%
All other services	\$701	\$742	\$727	5.9%	-2.1%	3.7%
Adjustments	\$368	\$363	\$341	n.a.	n.a.	n.a.
Capitation adjustment	\$107	\$99	\$77	n.a.	n.a.	n.a.
Other payments	\$261	\$264	\$265	1.0%	0.4%	1.4%
<i>Percent of total spending</i>						
All services <sup>a</sup>	100.0%	100.0%	100.0%	b	b	b
Inpatient hospital care	17.0%	17.2%	17.2%	0.2%	0.0%	0.2%
Outpatient services	24.0%	24.5%	25.4%	0.4%	0.9%	1.3%
Hospitals	21.4%	22.2%	23.4%	0.8%	1.2%	2.0%
Other free-standing facilities	2.6%	2.3%	2.0%	-0.4%	-0.3%	-0.7%
Physician and other professional services	32.4%	32.6%	33.2%	0.2%	0.6%	0.8%
Pharmacy	20.3%	19.6%	18.7%	-0.7%	-0.9%	-1.7%
All other services	6.2%	6.1%	5.6%	-0.1%	-0.5%	-0.6%
<i>Spending per member year:</i>						
All services <sup>a</sup>	\$3,951	\$4,247	\$4,565	7.5%	7.5%	15.5%
Inpatient hospital care	\$652	\$710	\$766	8.9%	7.9%	17.5%
Outpatient services	\$920	\$1,010	\$1,128	9.8%	11.8%	22.7%
Hospitals	\$819	\$916	\$1,041	11.9%	13.7%	27.1%
Other free-standing facilities	\$101	\$93	\$87	-7.2%	-6.8%	-13.5%
Physician and other professional services	\$1,239	\$1,344	\$1,475	8.4%	9.8%	19.1%
Pharmacy	\$778	\$809	\$831	3.9%	2.7%	6.8%
All other services	\$238	\$252	\$248	5.9%	-1.5%	4.3%

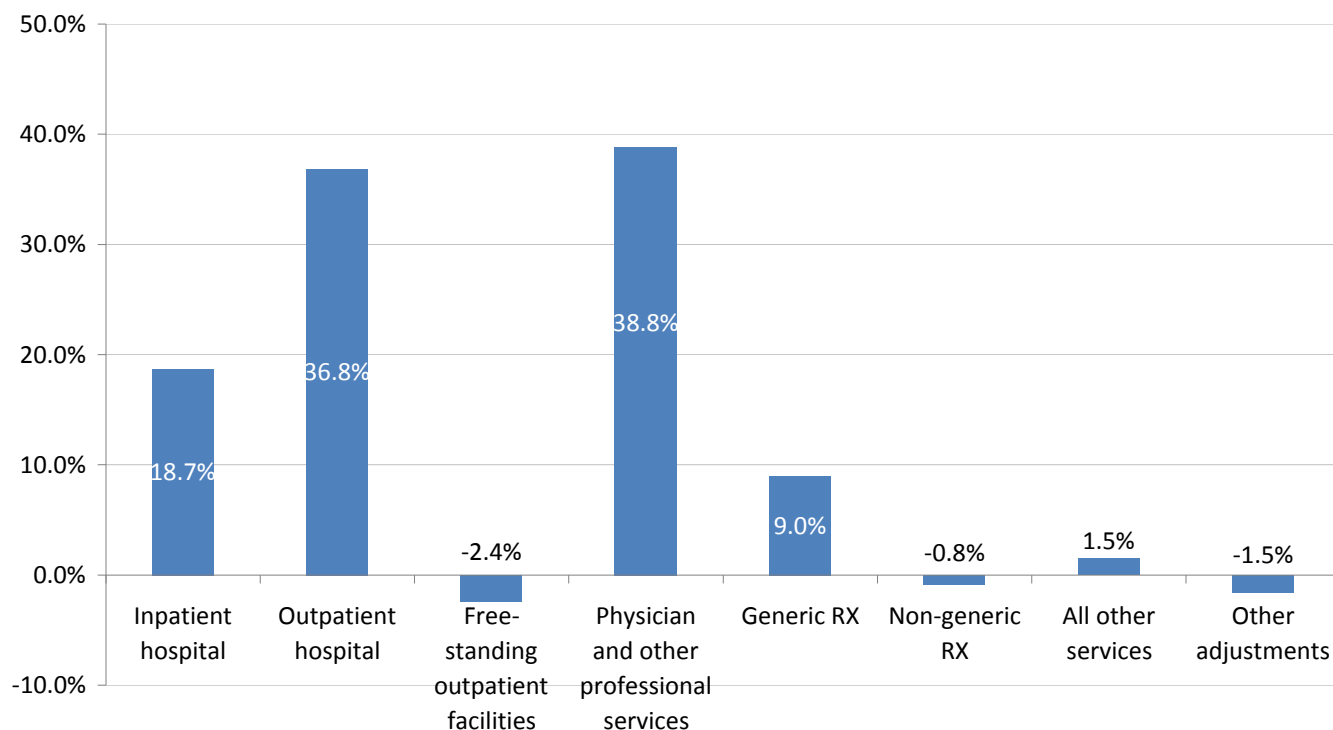
Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

<sup>a</sup> Expenditures for all services includes carrier payments that do not flow through the claims system. As a result, detail by service type may not sum to the pmpm expenditures for all services.

<sup>b</sup> Percent change is calculated as the change in percentage points.

Notes: Inpatient and outpatient facility expenditures exclude professional services billed separately. All other claims includes skilled nursing facilities, non-acute institutional care, and other unclassified claims. Capitated claims are valued at the fee-for-service equivalent. Capitation adjustments reconcile total capitation payments and the fee-for-service equivalents that carriers reported at the claims level; other reported payments include pay-for-performance incentive payments and network management fees that did not flow through the claims system.

**Figure A.6: Growth in Spending by Service Type as a Percent of Total Spending Growth, 2006-2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Inpatient and outpatient facility expenditures exclude professional services billed separately. All other claims includes skilled nursing facilities, non-acute institutional care, and other unclassified claims. Capitated claims are valued at the fee-for-service equivalent. Other adjustments include reconciliation of total capitation payments and the fee-for-service equivalents that carriers reported at the claims level, plus other reported payments (such as pay-for-performance incentive payments and network management fees) that did not flow through the claims system.

**Table A.2 Total Spending, Spending Per Member Year, and Rates of Growth by Insurance Market Sector, 2006-2008**

	All enrollees	Self-insured plans	Individuals	Small groups	Medium-sized groups	Large groups
<b>Total spending (in millions)</b>						
2006	\$11,282.4	\$4,687.7	\$255.3	\$2,292.6	\$2,157.3	\$1,889.4
2007	\$12,157.6	\$5,160.5	\$275.6	\$2,428.5	\$2,297.0	\$1,996.0
2008	\$13,038.8	\$5,774.6	\$401.0	\$2,497.2	\$2,421.8	\$1,944.3
<i>Rates of growth</i>						
Total 2006-2008	15.6%	23.2%	57.1%	8.9%	12.3%	2.9%
2006-2007	7.8%	10.1%	8.0%	5.9%	6.5%	5.6%
2007-2008	7.2%	11.9%	45.5%	2.8%	5.4%	-2.6%
<i>Percent of growth</i>						
Total 2006-2008	100.0%	61.9%	8.3%	11.6%	15.1%	3.1%
2006-2007	100.0%	54.0%	2.3%	15.5%	16.0%	12.2%
2007-2008	100.0%	69.7%	14.2%	7.8%	14.2%	-5.9%
<b>Spending per member year</b>						
2006	\$3,951	\$4,087	\$5,584	\$3,574	\$3,510	\$3,781
2007	\$4,247	\$4,376	\$5,827	\$3,841	\$3,812	\$4,098
2008	\$4,565	\$4,749	\$5,696	\$4,123	\$4,050	\$4,408
<i>Rates of growth</i>						
Total 2006-2008	15.5%	16.2%	2.0%	15.4%	15.4%	16.6%
2006-2007	7.5%	7.1%	4.4%	7.5%	8.6%	8.4%
2007-2008	7.5%	8.5%	-2.2%	7.3%	6.2%	7.5%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Capitation adjustments and other payments reported by carriers that did not flow through the claims system are excluded in the market sector detail, but included in all-enrollee expenditures.

**Table A.3: Drivers of Expenditure Growth by Type of Service, 2006-2007**

Type of Service	Annual Percent Growth in Spending	Percentage Point Change in Spending Due to the Change in:		
		Price	Number of service units	Service mix
Teaching hospital inpatient care	8.5%	8.8%	0.4%	-0.7%
Non-teaching hospital inpatient care	8.5%	9.8%	-2.1%	0.8%
Hospital outpatient services <sup>a</sup>	12.1%	6.6%	7.3%	-1.8%
Physician and other professional services	7.9%	8.7%	1.9%	-2.7%
Imaging services <sup>b</sup>	12.9%	6.0%	7.9%	-1.0%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

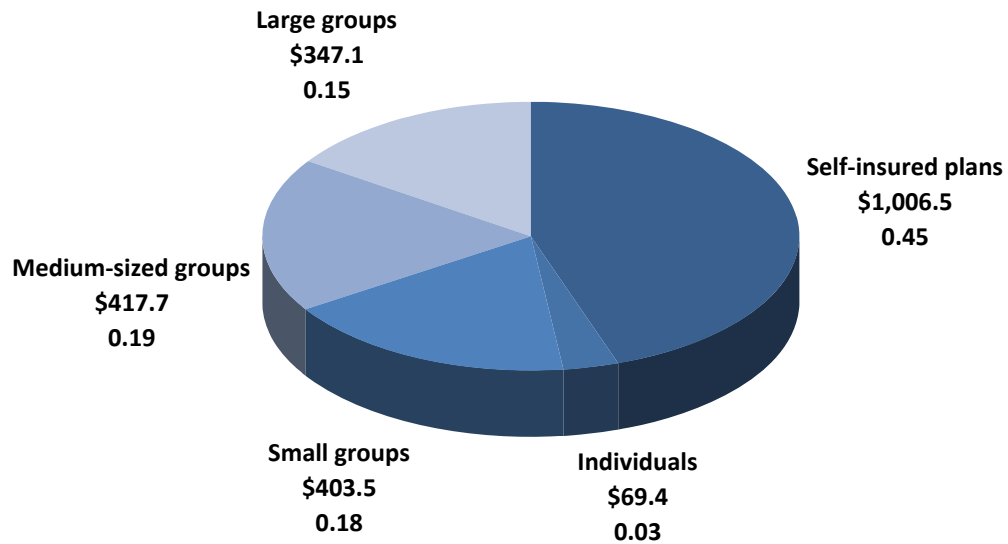
Notes: Because of the relatively high rate of incurred but not reported claims in 2008, only 2006-2007 growth drivers are reported. The figures reported in the table were calculated for a “market basket” of services, representing about 90 percent of total spending in each major service category each year. Therefore, percentage growth rates reported here may differ from those presented elsewhere in the analysis.

<sup>a</sup> Estimate includes only facility charges. Physician and other professional charges, when billed separately, are excluded.

<sup>b</sup> Estimate includes facility and professional fees. Inpatient facility charges for imaging services provided during a hospital stay are not included.



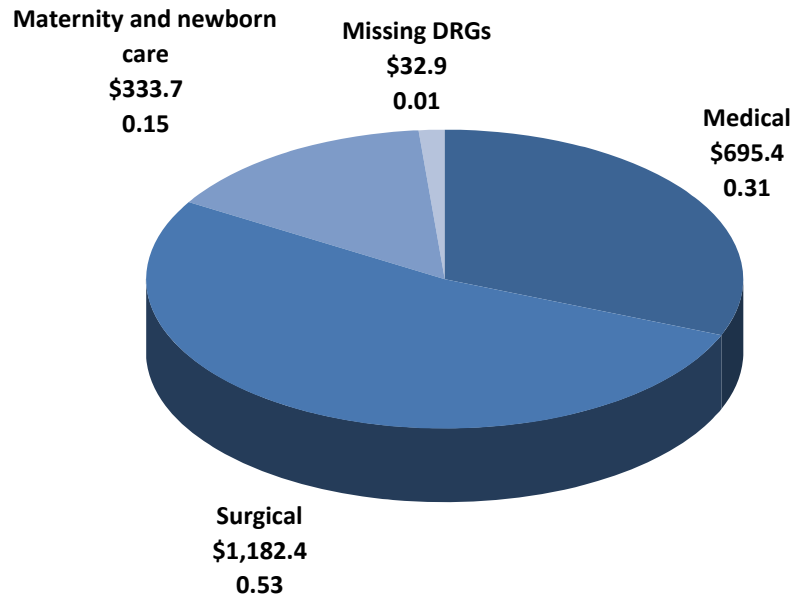
**Figure B.1: Total Spending for Privately Insured Hospital Inpatient Care by Insurance Market Sector, 2008**  
(\$ millions)



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

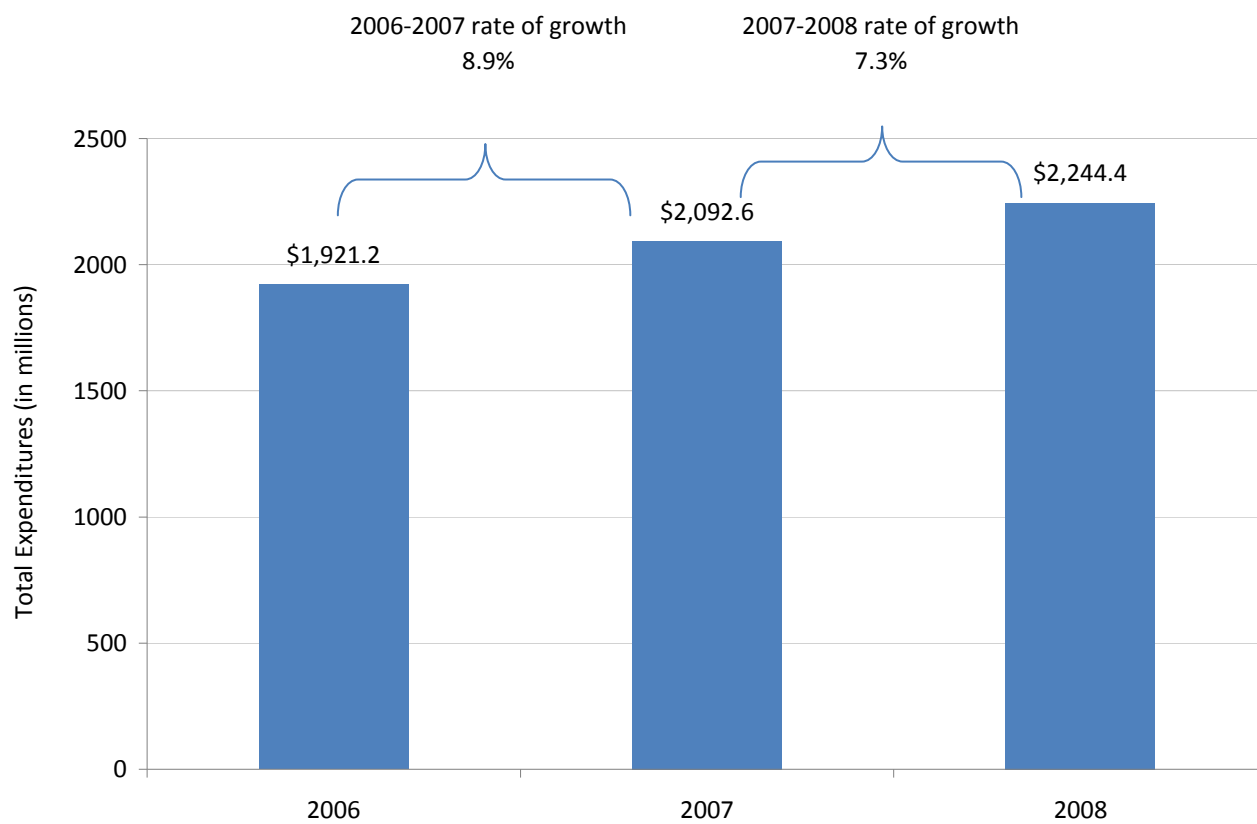
**Figure B.2: Total Spending for Privately Insured Hospital Inpatient Care by Type of Service,  
2008  
(\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure B.3: Total Spending for Privately Insured Hospital Inpatient Care and Annual Rate of Growth, 2006-2008**

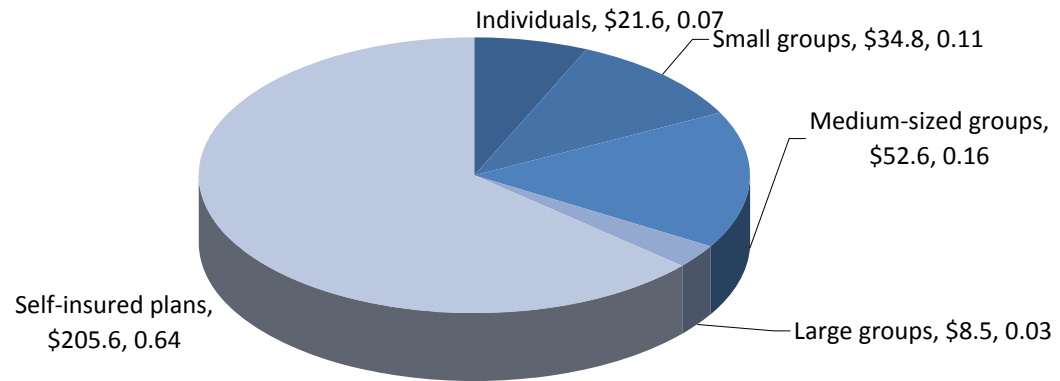


Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure B.4: Change in Total Spending for Privately Insured Hospital Inpatient Care and Percent of Change by Insurance Market Sector, 2006-2008 (\$ millions)**

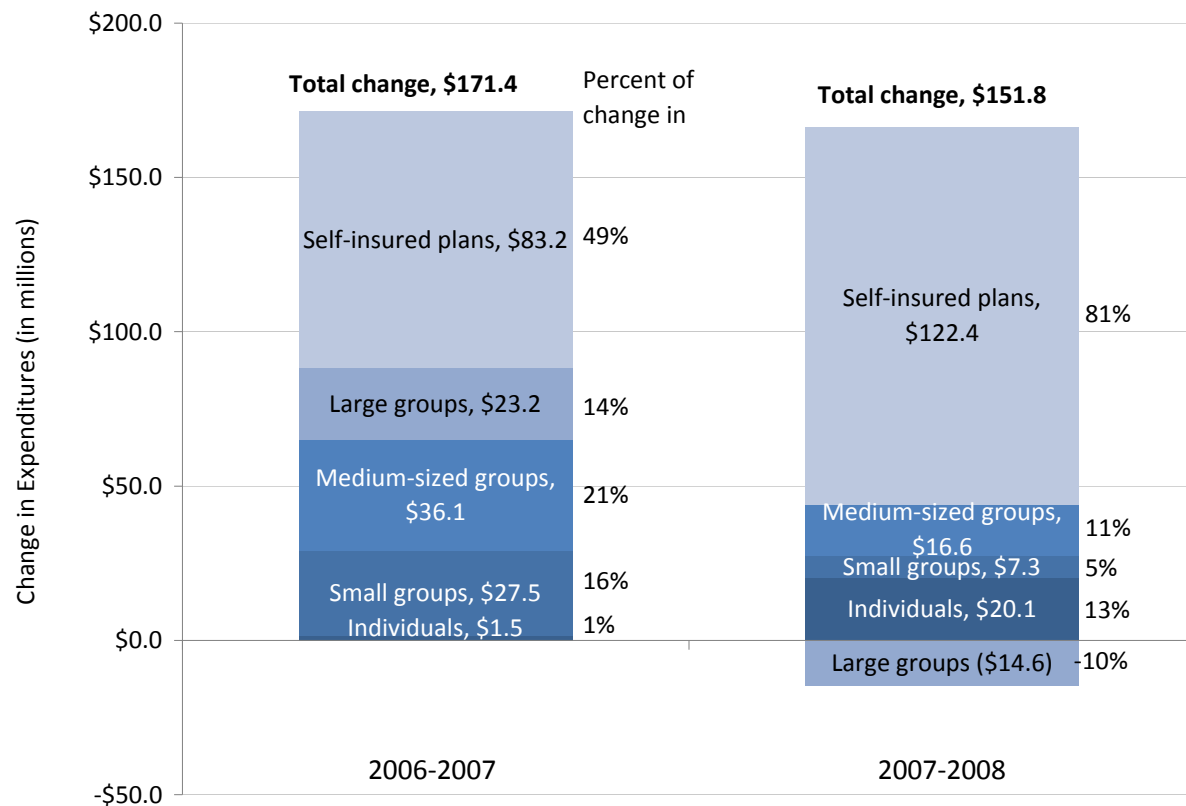
**Total change in inpatient spending = \$323.2 million**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at acute inpatient facilities. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure B.4.a: Annual Change in Total Spending for Privately Insured Hospital Inpatient Care and Percent of Change by Insurance Market Sector, 2006-2008 (\$ millions)**

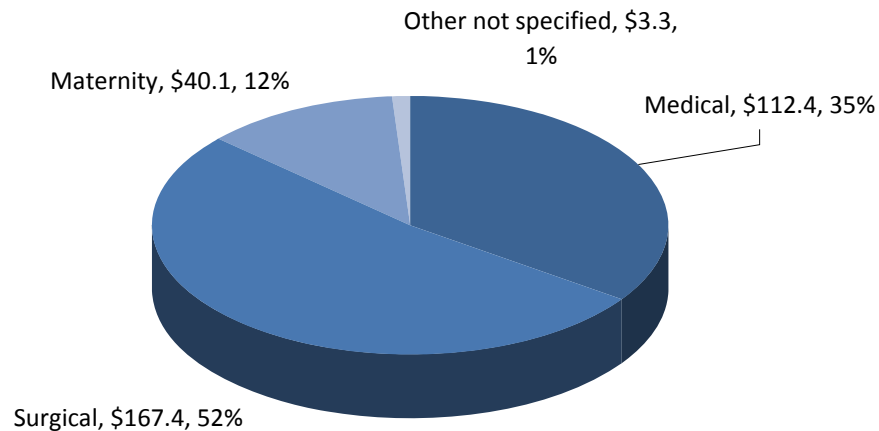


Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at acute inpatient facilities. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure B.5: Change in Total Spending for Privately Insured Hospital Inpatient Care and Percent of Change by Type of Service, 2006-2008 (\$ millions)**

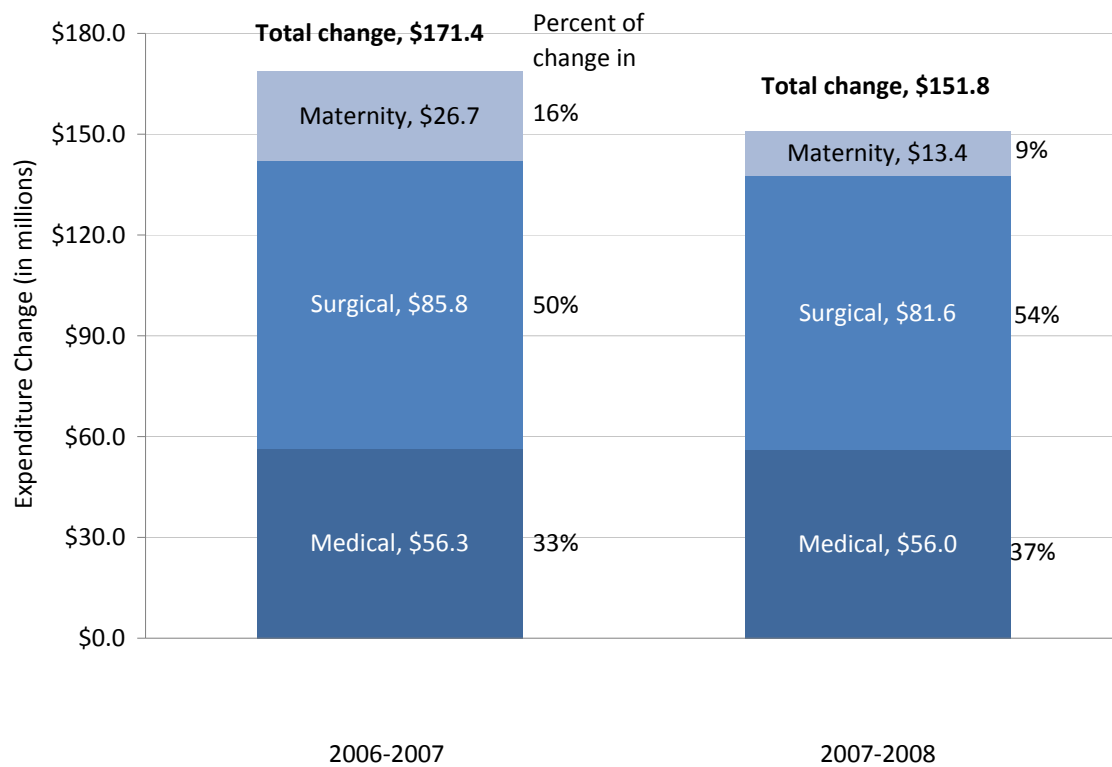
**Total change in inpatient spending = \$323.2 million**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. "Other not specified" includes hospitalizations with unknown or unclassifiable DRGs. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure B.5.a: Annual Change in Total Spending for Privately Insured Hospital Inpatient Care and Percent of Change by Type of Service, 2006-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Hospitalizations with unknown or unclassifiable DRGs are not displayed. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude

**Table B.1: Spending Per Member Year for Privately Insured Hospital Inpatient Services by Insurance Market Sector and Percent Change, 2006-2008**

	Fully-insured					Self-insured plans
	All plans	Individuals	Small groups	Medium-sized groups	Large groups	
2006	\$652	\$1,047	\$575	\$594	\$678	\$698
2007	\$710	\$1,043	\$627	\$666	\$743	\$750
2008	\$766	\$986	\$666	\$699	\$787	\$828
Percent change, 2006-2008	17.5%	-5.8%	15.9%	17.6%	16.1%	18.5%
2006-2007	8.9%	-0.4%	9.0%	12.1%	9.6%	7.4%
2007-2008	7.9%	-5.4%	6.3%	4.9%	5.9%	10.4%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.



**Table B.2: Components of Change in Spending for Privately Insured Hospital Inpatient Care Per Member Year by Type of Service, 2006-2008**

	Inpatient Spending per Member Year	Spending per Admission	Admissions per 1,000 Member Years	Number of Days per Admission	Spending per Day
<b>Total inpatient hospital services</b>					
2008	\$766	\$11,484	66.67	4.10	\$2,799
Percent growth, 2006-2008	17.5%	18.1%	-0.5%	1.3%	16.6%
2006-2007	8.9%	9.7%	-0.7%	0.9%	8.7%
2007-2008	7.9%	7.7%	0.2%	0.4%	7.3%
<i>By Type of Inpatient Service:</i>					
<b>Medical</b>					
2008	\$237	\$8,946	26.52	4.27	\$2,094
Percent growth, 2006-2008	20.0%	17.1%	2.5%	1.2%	15.6%
2006-2007	9.7%	9.5%	0.2%	1.0%	8.4%
2007-2008	9.4%	6.9%	2.3%	0.2%	6.7%
<b>Surgical</b>					
2008	\$403	\$21,489	18.77	4.34	\$4,952
Percent growth, 2006-2008	17.2%	17.2%	0.0%	-1.7%	19.3%
2006-2007	8.5%	9.4%	-0.9%	-0.3%	9.7%
2007-2008	8.0%	7.1%	0.8%	-1.5%	8.7%
<b>Maternity and newborn care</b>					
2008	\$114	\$5,575	20.42	3.68	\$1,513
Percent growth, 2006-2008	14.3%	20.2%	-4.9%	3.5%	16.1%
2006-2007	9.1%	11.2%	-1.9%	1.2%	9.9%
2007-2008	4.8%	8.1%	-3.1%	2.4%	5.6%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities and exclude missing DRGs. One carrier's data are excluded in the calculation of average length of stay because the discharge date was missing on the inpatient data file. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions and days were adjusted for missing data in 2007 and 2008; see methods appendix for details.

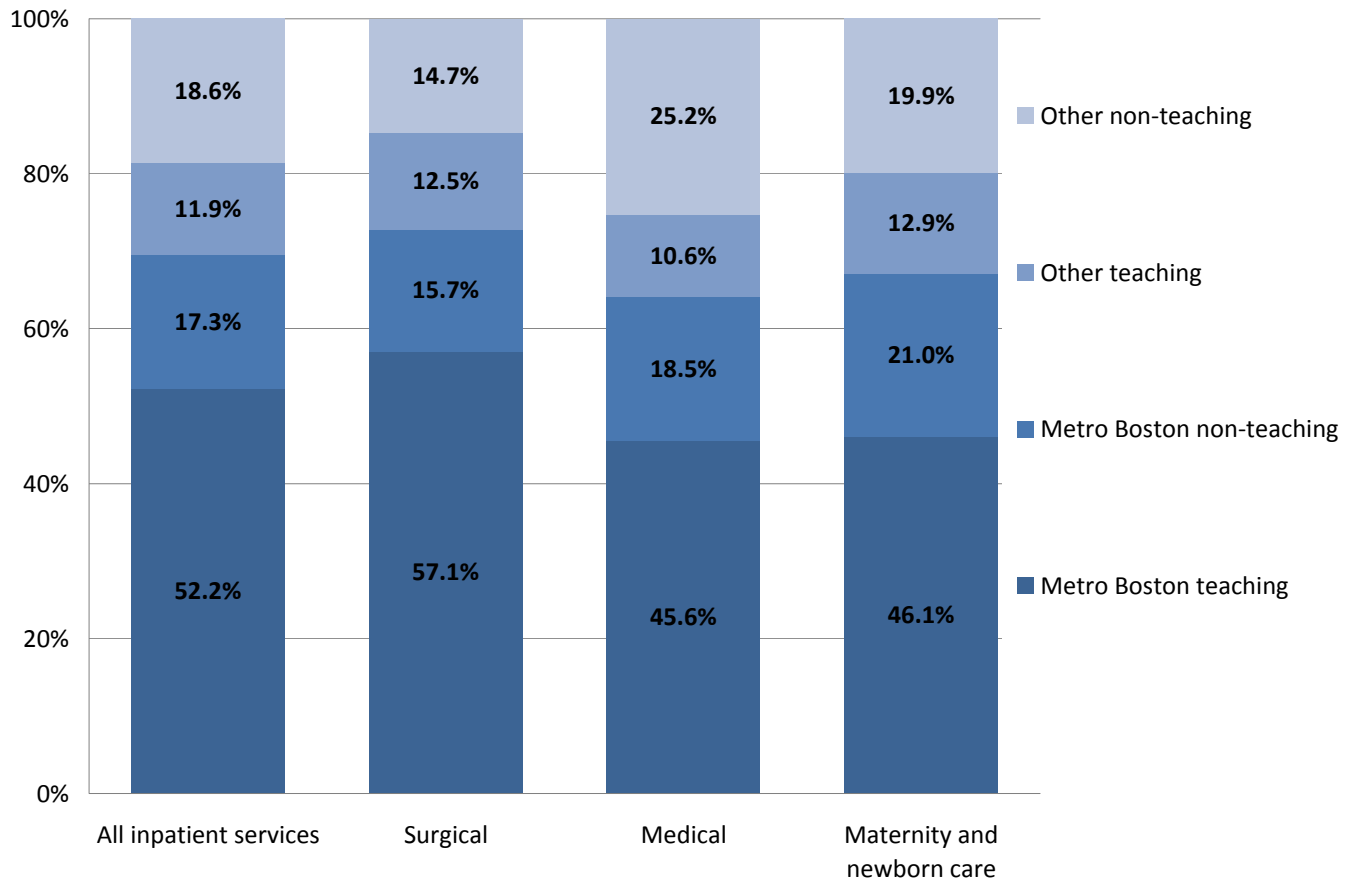
**Table B.3: Components of Change in Spending per Member Year for Privately Insured Hospital Inpatient Care by Insurance Market Sector, 2006-2008**

	Inpatient Spending per Member Year	Spending per Admission	Admissions per 1,000 Member Years	Number of Days per Admission	Spending per Day
<i>Self-insured plans</i>					
2008	\$828	\$11,654	71.02	4.15	\$2,807
Percent growth, 2006-2008	18.5%	17.5%	0.8%	0.2%	17.3%
2006-2007	7.4%	8.4%	-0.9%	0.7%	7.7%
2007-2008	10.4%	8.5%	1.8%	-0.5%	9.0%
<i>Fully-insured:</i>					
<i>Individuals</i>					
2008	\$986	\$12,799	77.05	4.52	\$2,832
Percent growth, 2006-2008	-5.8%	10.5%	-14.7%	-8.5%	20.8%
2006-2007	-0.4%	6.4%	-6.3%	-6.7%	14.0%
2007-2008	-5.4%	3.9%	-9.0%	-1.9%	5.9%
<i>Small groups</i>					
2008	\$666	\$11,363	58.64	3.93	\$2,892
Percent growth, 2006-2008	15.9%	20.5%	-3.8%	1.1%	19.2%
2006-2007	9.0%	10.9%	-1.7%	1.7%	9.0%
2007-2008	6.3%	8.6%	-2.1%	-0.6%	9.3%
<i>Medium-sized groups</i>					
2008	\$699	\$10,946	63.82	4.01	\$2,727
Percent growth, 2006-2008	17.6%	19.4%	-1.5%	2.2%	16.8%
2006-2007	12.1%	12.4%	-0.3%	1.1%	11.2%
2007-2008	4.9%	6.2%	-1.2%	1.1%	5.0%
<i>Large groups</i>					
2008	\$787	\$11,584	67.93	4.03	\$2,874
Percent growth, 2006-2008	16.1%	15.6%	0.4%	-0.3%	15.9%
2006-2007	9.6%	9.0%	0.5%	-0.5%	9.6%
2007-2008	5.9%	6.1%	-0.1%	0.2%	5.8%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include facility charges only for care provided at acute inpatient facilities. United Health Care is excluded in the calculation of average length of stay because the discharge date is missing on the inpatient data file. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions and days were adjusted for missing data in 2007 and 2008; see methods appendix for details.

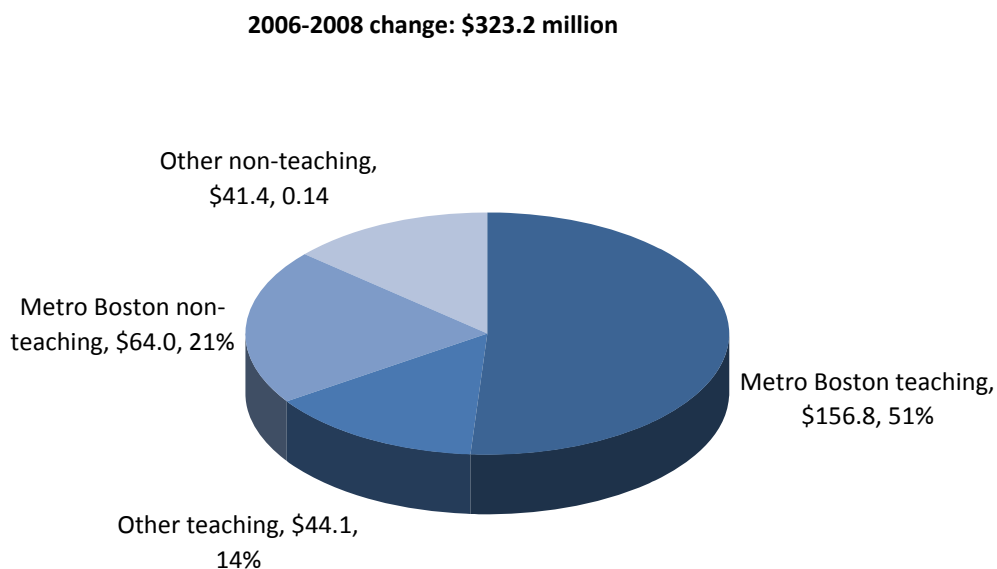
**Figure B.6: Distribution of Spending for Privately Insured Inpatient Care by Hospital Teaching Status, 2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Expenditures for out-of-state hospitals are excluded, as are expenditures for a small number of in-state facilities for which either location or teaching status was unidentified. Mental health and substance abuse services are included in medical services. All hospitalizations for pregnancy and childbirth as well as newborns and other neonates are included in the maternity category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

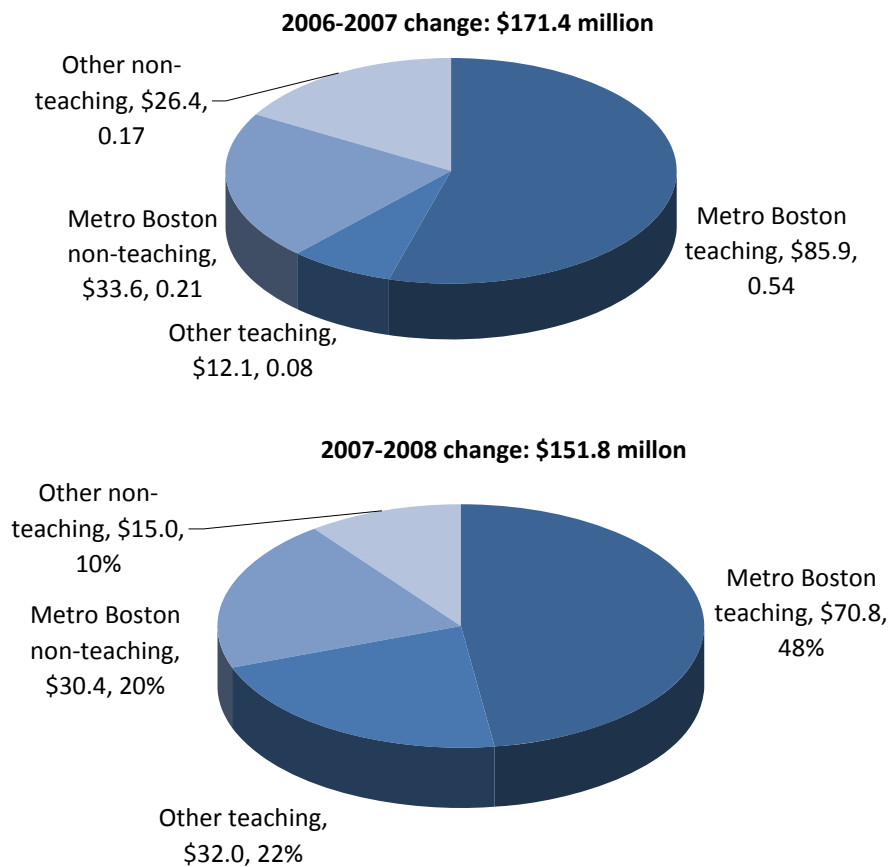
**Figure B.7: Distribution of the Change in Total Spending for Privately Insured Inpatient Care by Hospital Type and Metro Boston Location, 2006-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at acute inpatient facilities. Expenditures for out-of-state hospitals and a small number of in-state facilities where either location or teaching status was unidentified are not displayed. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

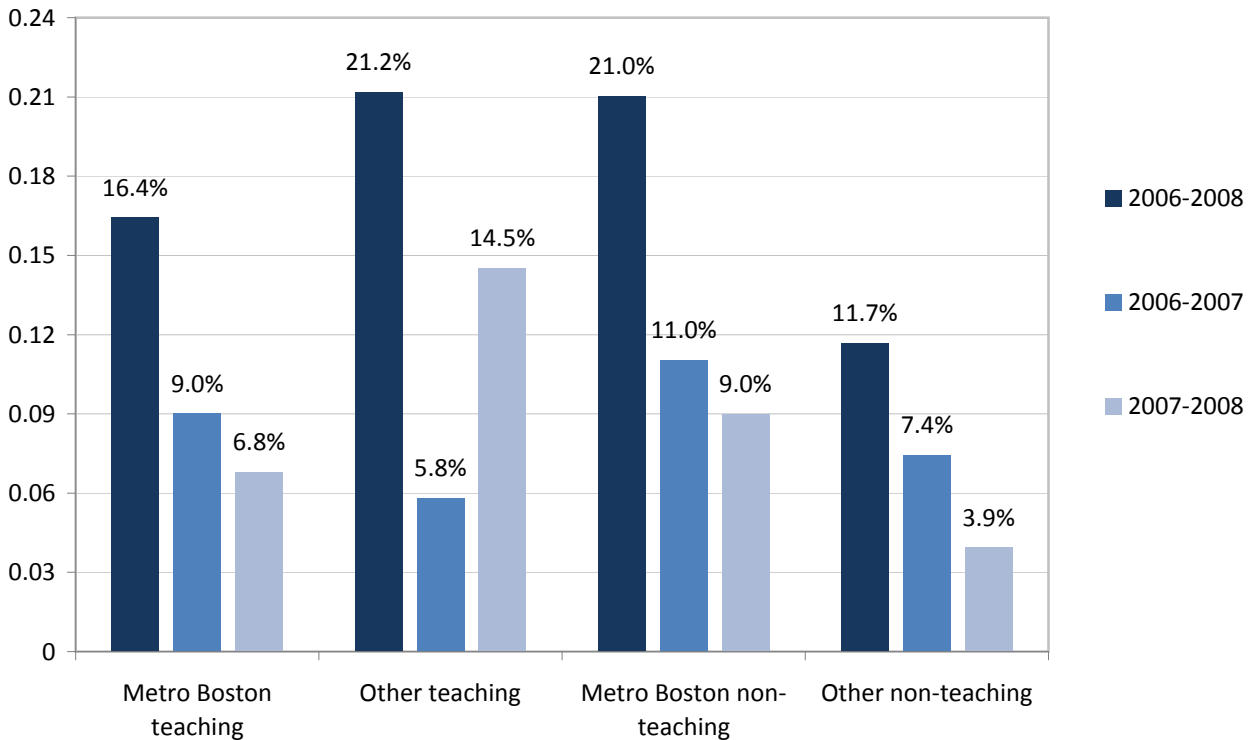
**Figure B.7.a: Distribution of the Change in Total Spending for Privately Insured Hospital Inpatient Care by Hospital Type and Metro Boston Location, 2006-2007 and 2007-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at acute inpatient facilities. Expenditures for out-of-state hospitals and a small number of in-state facilities where either location or teaching status was unidentified are not displayed. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

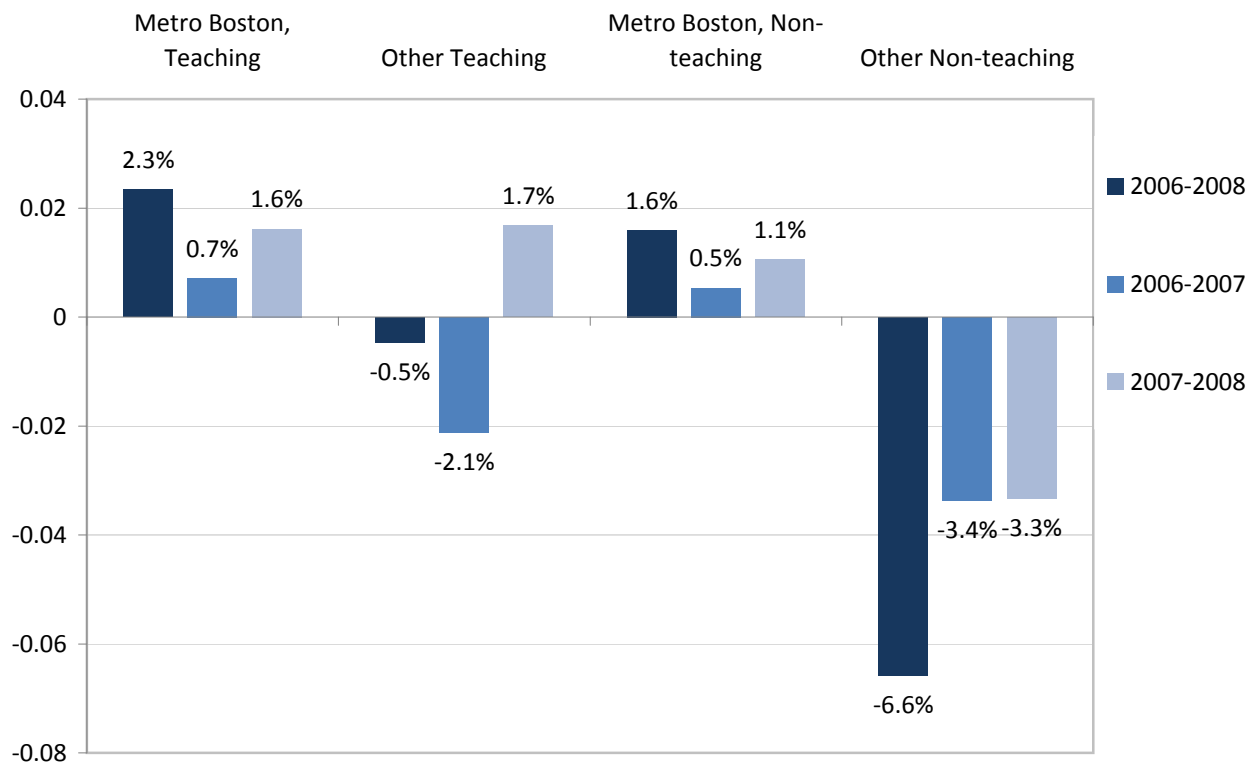
**Figure B.8: Percent Change in Total Spending for Privately Insured Inpatient Care  
by Hospital Teaching Status and Location, 2006-2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. Expenditures for out-of-state hospitals are excluded, as are expenditures for a small number of in-state facilities for which either location or teaching status was unidentified. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure B.9: Percent Change in Number of Admissions per Thousand Member Years for Privately Insured Inpatient Care by Hospital Type and Metro Boston Location, 2006-2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include facility charges only for care provided at acute inpatient facilities. Out-of-state hospitals are excluded. A small number of in-state facilities are omitted, for which either location or teaching status was unidentified. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions was adjusted for missing data in 2007 and 2008; see methods appendix for details.

**Table B.4: Components of Change in Spending per Member Year for Privately Insured Hospital Inpatient Care by Hospital Teaching Status and Metro Boston Location, 2006-2008**

	Inpatient Spending per Member Year	Spending per Admission	Admissions per 1,000 Member Years	Number of Days per Admission	Spending per Inpatient Day
<b>Teaching hospitals</b>					
2008	\$465	\$14,977	31.05	4.42	\$3,386
Percent change 2006-2008	18.0%	16.0%	1.7%	0.0%	16.0%
2006-2007	8.5%	8.4%	0.1%	-0.6%	9.0%
2007-2008	8.8%	7.0%	1.6%	0.6%	6.4%
<b>Metro Boston teaching hospitals</b>					
2008	\$379	\$15,573	24.33	4.47	\$3,487
Percent change 2006-2008	17.1%	14.5%	2.3%	-1.3%	15.9%
2006-2007	9.0%	8.3%	0.7%	-0.9%	9.3%
2007-2008	7.4%	5.7%	1.6%	-0.4%	6.1%
<b>Other teaching hospitals</b>					
2008	\$86	\$12,820	6.72	4.27	\$3,001
Percent change 2006-2008	21.9%	22.5%	-0.5%	5.0%	16.6%
2006-2007	5.8%	8.1%	-2.1%	0.6%	7.5%
2007-2008	15.2%	13.3%	1.7%	4.4%	8.5%
<b>Non-teaching hospitals</b>					
2008	\$261	\$7,940	32.84	3.59	\$2,211
Percent change 2006-2008	16.7%	20.4%	-3.1%	-0.9%	21.6%
2006-2007	9.1%	11.0%	-1.7%	-0.8%	11.9%
2007-2008	6.9%	8.5%	-1.4%	-0.1%	8.6%
<b>Metro Boston non-teaching hospitals</b>					
2008	\$126	\$8,626	14.56	3.69	\$2,336
Percent change 2006-2008	21.7%	19.8%	1.6%	-1.6%	21.8%
2006-2007	11.1%	10.5%	0.5%	-1.6%	12.2%
2007-2008	9.6%	8.5%	1.1%	0.0%	8.5%
<b>Other non-teaching hospitals</b>					
2008	\$135	\$7,394	18.28	3.51	\$2,106
Percent change 2006-2008	12.3%	20.3%	-6.6%	-0.6%	21.0%
2006-2007	7.4%	11.2%	-3.4%	-0.3%	11.5%
2007-2008	4.6%	8.2%	-3.3%	-0.3%	8.5%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data only include facility charges for care provided at acute inpatient facilities. United Health Care is excluded in the calculation of average length of stay because the discharge date is missing on the inpatient data file. Out-of-state hospitals, as well as a small number of in-state facilities whose location or teaching status could not be determined, are included in the total but excluded from the regional categories. Because total member months cannot be distributed based on members' location, total member months are used in all per member year calculations across regions. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. The number of admissions and days were adjusted for missing data in 2007 and 2008; see methods appendix for details.



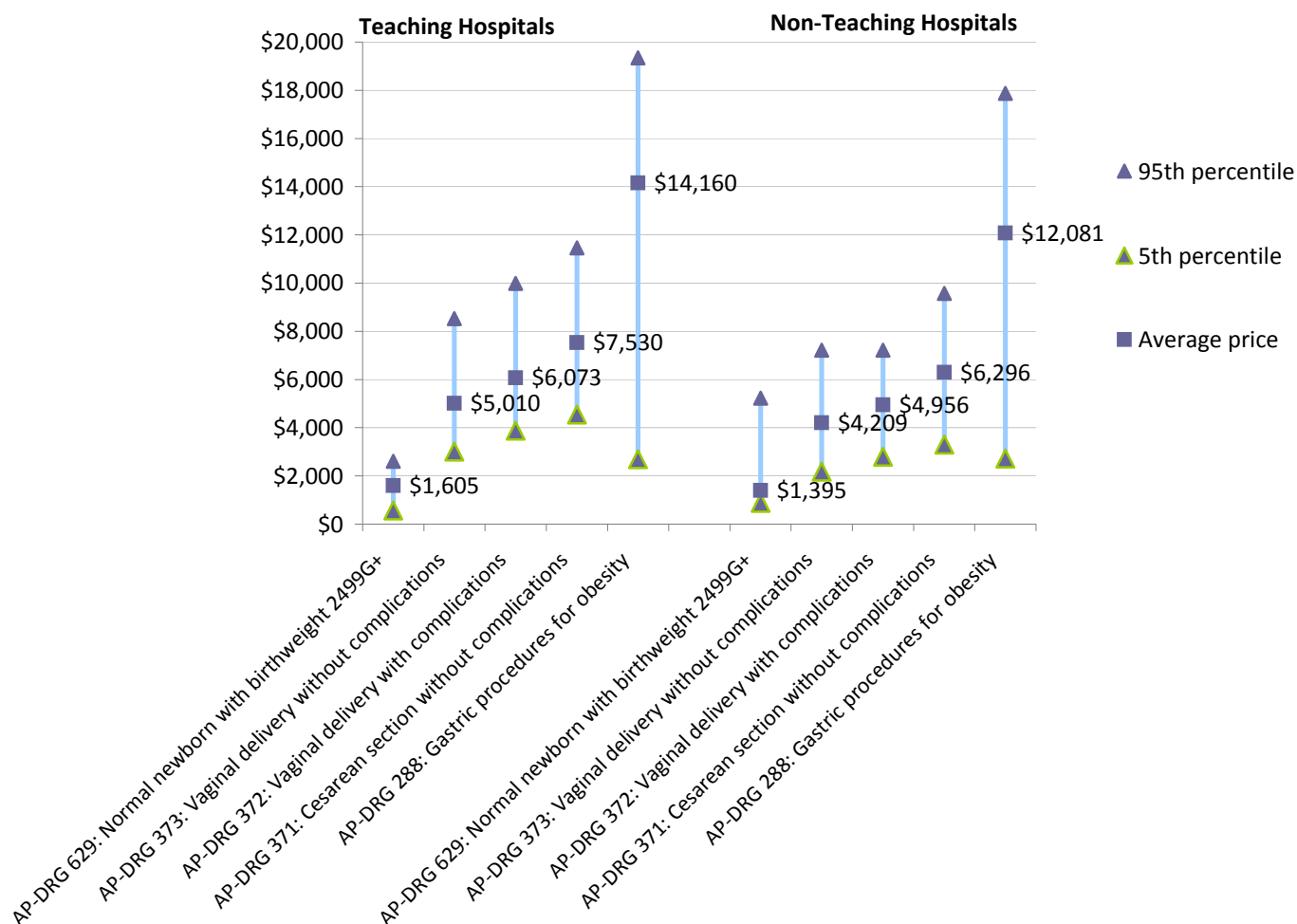
**Table B.5. Drivers of Change in Total Spending for Privately Insured Hospital Inpatient Care By Hospital Teaching Status, 2006-2007**

	Change in Total Spending	Change in total spending due to change in:		
		Price	Number of Admissions	Service Mix
<b>Teaching hospitals</b>				
2006 - 2007				
All market basket inpatient care (in millions)	\$81.5	\$84.1	\$3.6	-\$6.3
Percent of total change	100.0%	103.2%	4.5%	-7.7%
Contribution to total change (in percentage points)	8.5%	8.8%	0.4%	-0.7%
<b>Non-teaching hospitals</b>				
2006 - 2007				
All market basket inpatient care (in millions)	\$50.5	\$58.3	-\$12.5	\$4.8
Percent of total change	100.0%	115.3%	-24.8%	9.4%
Contribution to total change (in percentage points)	8.5%	9.8%	-2.1%	0.8%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at acute inpatient facilities. The change in the number of admissions combines changes in the number of insured member years and the number of admissions per member year. Certain carriers and claims are excluded; see decomposition methods in the appendix for details.

**Figure III.B.10: Price Variation for Selected High-Frequency DRGs by Hospital Teaching Status, 2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Note: Data include facility charges only for care provided at acute inpatient facilities. Percentiles are calculated and compared by carrier, and only the highest 95th percentile and the lowest 5th percentile are presented, together with average price across all carriers.

**Table C.1: Distribution of Outpatient Spending by Type of Service and Facility Type, 2008 (\$ millions)**

	Total		Hospitals		Free-Standing Facilities	
	Spending	Percent of Total Spending	Spending	Percent of Total Spending	Spending	Percent of Total Spending
All outpatient services	\$3,307.3	100.0%	\$3,052.2	100.0%	\$255.1	100.0%
Procedures	1,024.8	31.0%	838.4	27.5%	186.4	73.1%
Imaging	783.0	23.7%	773.5	25.3%	9.5	3.7%
Evaluation and management	354.0	10.7%	341.7	11.2%	12.2	4.8%
All other	1,145.6	34.6%	1,098.5	36.0%	47.0	18.4%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Type of service is categorized with the BETOS grouper, using the CPT procedure codes on each claim. Lab and other tests, durable medical equipment, other outpatient services, and claims without a CPT code are included in the "all other" row. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Table C.2: Annual Growth in Spending for Privately Insured Outpatient Care by Type of Facility, 2006-2008**

	Total outpatient spending (\$ millions)			Percent change		
	2006	2007	2008	2006-2008	2006-2007	2007-2008
Total	\$2,711.7	\$2,976.7	\$3,307.3	22.0%	9.8%	11.1%
Hospitals	2,415.1	2,701.2	3,052.2	26.4%	11.8%	13.0%
Free-standing facilities	296.7	275.4	255.1	-14.0%	-7.2%	-7.4%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Table C.3: Change in Spending for Privately Insured Outpatient Services and Percent of Change by Type of Service, 2006-2008**

	Total		Hospitals		Free-Standing Facilities	
	Change in spending 2006-2008 (\$ millions)	Percent of change	Change in spending 2006-2008 (\$ millions)	Percent of change	Change in spending 2006-2008 (\$ millions)	Percent of change
All outpatient services	\$595.6	100.0%	\$637.1	100.0%	-\$41.6	100.0%
Procedures	\$200.4	33.6%	\$217.4	34.1%	-\$17.0	40.8%
Imaging	\$165.6	27.8%	\$166.6	26.1%	-\$1.0	2.5%
Evaluation and management	\$62.4	10.5%	\$67.9	10.7%	-\$5.5	13.2%
Other	\$167.2	28.1%	\$185.3	29.1%	-\$18.1	43.5%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Type of service is categorized with the BETOS grouper, using the CPT procedure codes on each claim. Lab and other tests, durable medical equipment, other outpatient services, and claims without a CPT code are included in the "all other" row. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Table C.4: Spending Per Member Year for Privately Insured Outpatient Services by Insurance Market Sector, 2006-2008**

	All plans	Fully-insured				Self-insured plans
		Individuals	Small groups	Medium-sized groups	Large groups	
2006	\$920	\$1,308	\$892	\$841	\$904	\$969
2007	\$1,010	\$1,436	\$970	\$931	\$1,000	\$1,058
2008	\$1,128	\$1,428	\$1,080	\$1,029	\$1,124	\$1,185
Percent change, 2006-2008	22.7%	9.2%	21.1%	22.4%	24.3%	22.4%
2006-2007	9.8%	9.8%	8.7%	10.7%	10.7%	9.2%
2007-2008	11.8%	-0.6%	11.4%	10.6%	12.3%	12.1%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Table C.5: Factors Contributing to Change in Total Spending per Member Year for Privately Insured Outpatient Care by Type of Facility, 2006-2008**

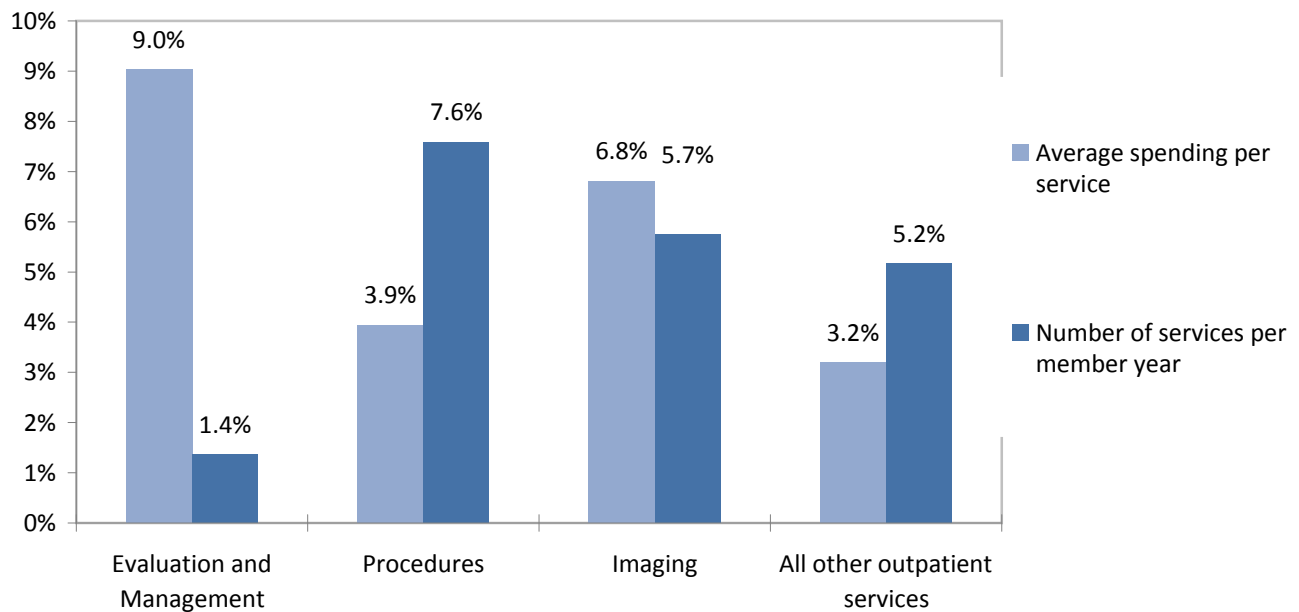
	Spending per Member Year	Average Spending per Service <sup>a</sup>	Number of Services per Member Year
<b>All Outpatient Services</b>			
2008	\$1,128	\$128	8.84
Percent change 2006-2008	22.7%	11.2%	10.3%
2006-2007	9.8%	6.2%	3.4%
2007-2008	11.8%	4.7%	6.7%
<b>All Hospital Outpatient</b>			
2008	\$1,041	\$123	8.48
Percent change 2006-2008	27.1%	13.2%	12.3%
2006-2007	11.9%	7.5%	4.1%
2007-2008	13.7%	5.3%	7.9%
<b>All Free-Standing Facility Outpatient</b>			
2008	\$87	\$241	0.36
Percent change 2006-2008	-13.5%	8.0%	-21.8%
2006-2007	-7.2%	0.1%	-8.1%
2007-2008	-6.8%	8.0%	-14.9%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

<sup>a</sup> Services are defined at the claims line level. Therefore, changes in the number of services per member month may reflect a change in the number of claims that are submitted to capture the same service units. Conversely, changes in the volume of service units included on a single claim are not reflected. (For example, injectable drugs are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) Consequently, a change in the average expenditure per service may reflect changes in the price per service unit, changes in the number of service units per claim line, or a change in the mix of services provided.

**Figure III.C.1: Average Annual Percent Change in Spending per Privately Insured Outpatient Service and Number of Outpatient Services per Member Year by Major Type of Service, 2006-2008**

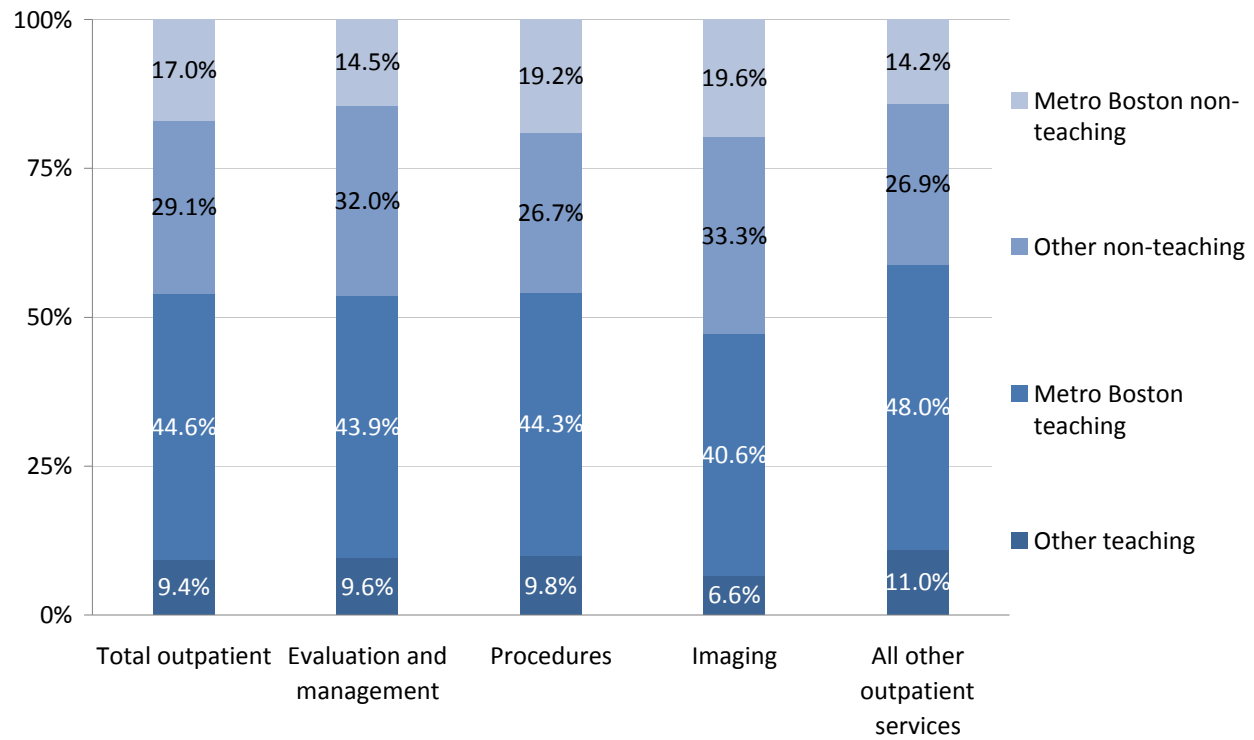


Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care provided at hospitals and free-standing facilities. Type of service is classified with the BETOS grouper, using the CPT procedure code on each claim. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data. Services are defined at the claims line level. Therefore, changes in the number of services per member year may reflect a change in the number of claims that are submitted to capture the same service units. Conversely, changes in the volume of service units included on a single claim are not reflected. (For example, injectable drugs are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) Consequently, a change in the average expenditure per service may reflect changes in the price per service unit, changes in the number of service units per claim line, or a change in the mix of services provided.



**Figure C.2: Distribution of Spending for Major Types of Privately Insured Hospital Outpatient Services, by Hospital Teaching Status and Metro Boston Location, 2008**

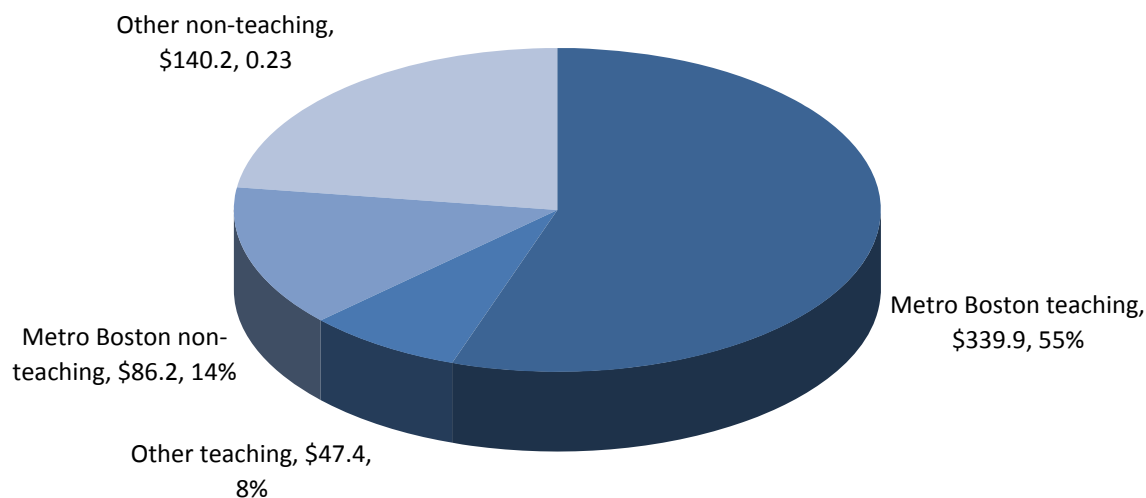


Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Expenditures for hospital outpatient departments include only facility charges. Expenditures for out-of-state hospitals are excluded, as are expenditures for a small number of in-state facilities for which either location or teaching status was unidentified. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Figure C.3: Distribution of the Change in Total Spending for Hospital Outpatient Care by Hospital Type and Metro Boston Location, 2006-2008 (\$ millions)**

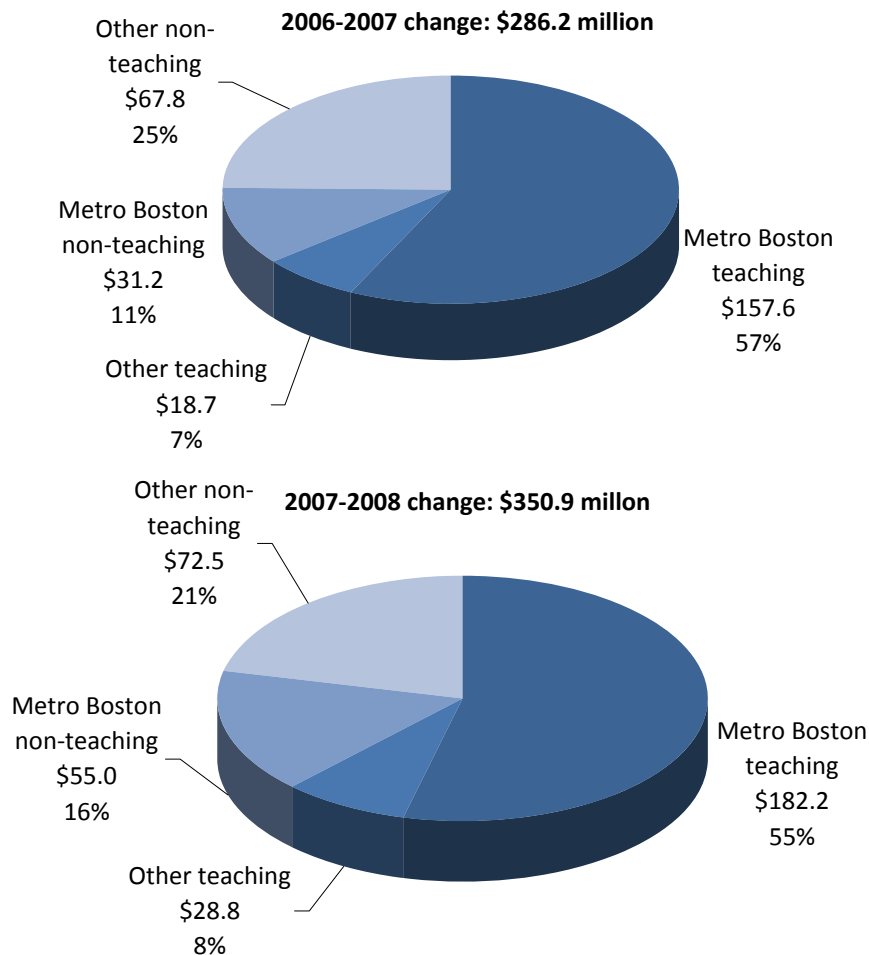
**2006-2008 change in spending for hospital outpatient care: \$637.1 million**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at outpatient hospital facilities. Expenditures for out-of-state hospitals and for a small number of in-state facilities for which either location or teaching status was unidentified are not displayed. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Figure C.3a: Distribution of the Change in Total Expenditures for Hospital Outpatient Care by Hospital Type and Boston Location, 2006-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for care provided at outpatient hospital facilities.

Expenditures for out-of-state hospitals and for a small number of in-state facilities for which either location or teaching status was unidentified are not displayed. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data.

**Table C.6: Factors Contributing to Change in Total Spending per Member Year for Privately Insured Hospital Outpatient Care by Metro Boston Location and Teaching Status, 2006-2008**

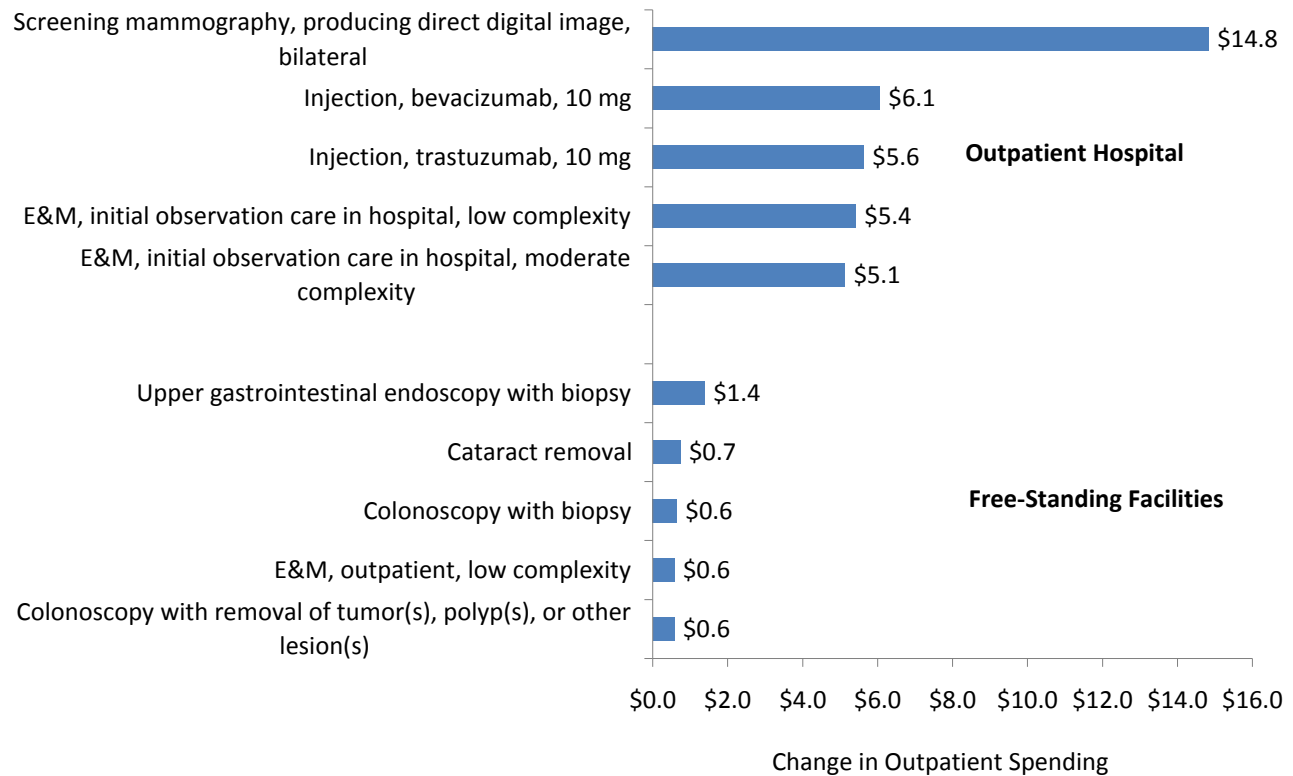
	Spending per Member Year	Average Spending per Service <sup>a</sup>	Number of Services per Member Year
<b>Total hospital outpatient services</b>			
2008	\$1,041	\$123	8.5
Percent change 2006-2008	27.1%	13.2%	12.3%
2006-2007	11.9%	7.5%	4.1%
2007-2008	13.7%	5.3%	7.9%
<b>Metro Boston teaching hospitals</b>			
2008	\$446	\$156	2.9
Percent change 2006-2008	35.9%	20.6%	12.8%
2006-2007	16.3%	10.9%	4.8%
2007-2008	16.9%	8.7%	7.6%
<b>Metro Boston non-teaching hospitals</b>			
2008	\$170	\$106	1.6
Percent change 2006-2008	21.7%	9.4%	11.2%
2006-2007	7.6%	6.1%	1.4%
2007-2008	13.1%	3.1%	9.7%
<b>Other Teaching Hospitals</b>			
2008	\$94	\$111	0.8
Percent change 2006-2008	21.6%	6.4%	14.4%
2006-2007	8.2%	2.1%	6.0%
2007-2008	12.4%	4.2%	7.9%
<b>Other Non-Teaching Hospitals</b>			
2008	\$290	\$99	0.24
Percent change 2006-2008	20.4%	7.3%	12.2%
2006-2007	9.5%	5.1%	4.2%
2007-2008	9.9%	2.1%	7.7%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustment and other payments that are not captured in the claims data. Spending details may not add to totals due to payments to hospitals outside Massachusetts.

<sup>a</sup> Services are defined at the claims line level. Therefore, changes in the number of services per member month may reflect a change in the number of claims that are submitted to capture the same service units. Conversely, changes in the volume of service units included on a single claim are not reflected. (For example, injectable drugs are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) Consequently, a change in the average expenditure per service may reflect changes in the price per service unit, changes in the number of service units per claim line, or a change in the mix of services provided.

**Figure C.4: Selected Services Accounting for Largest Growth in Total Spending for Privately Insured Outpatient Services by Type of Facility, 2007-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include facility charges only for outpatient care. Certain claims (representing 20 percent of total outpatient expenditures in 2008) are excluded. See the methods appendix for details.

**Table C.7. Drivers of Change in Total Spending for Privately Insured Outpatient Services, 2006-2007**

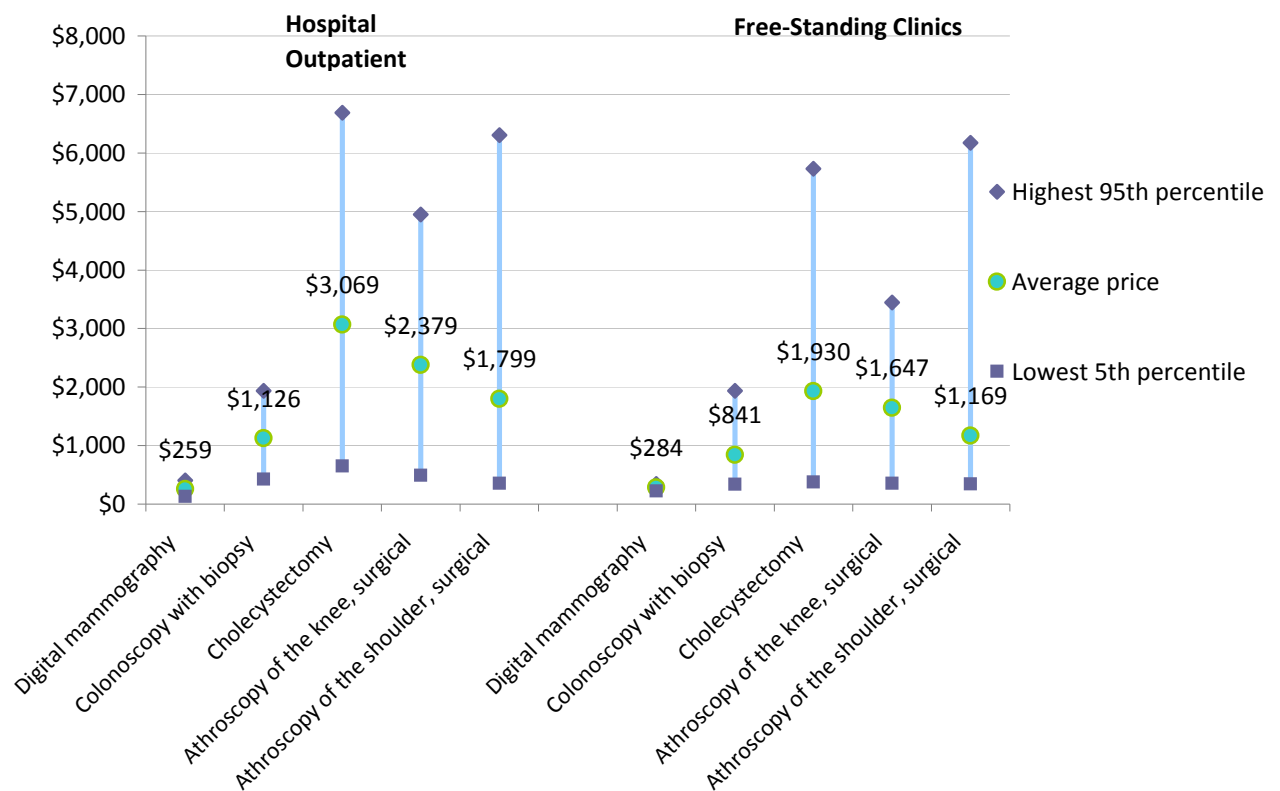
	Change in Spending	Change in spending due to the change in:		
		Price	Number of Service Units <sup>a</sup>	Service Mix
All market basket outpatient services (\$ millions)	\$267.2	\$146.3	\$160.8	-\$39.9
Percent of total change, all market basket outpatient services	100.0%	54.8%	60.2%	-14.9%
Contribution to total change (in percentage points)	12.1%	6.6%	7.3%	-1.8%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include only facility charges for outpatient care. Certain claims are excluded; see the methods appendix for details.

<sup>a</sup> The number of service units corresponds to the number of times the service or procedure billed for was performed; one claim may include multiple service units. (For example, injectable drugs are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) A change in the number of service units may reflect change in the number of insured member years as well as the number of service units per member year.

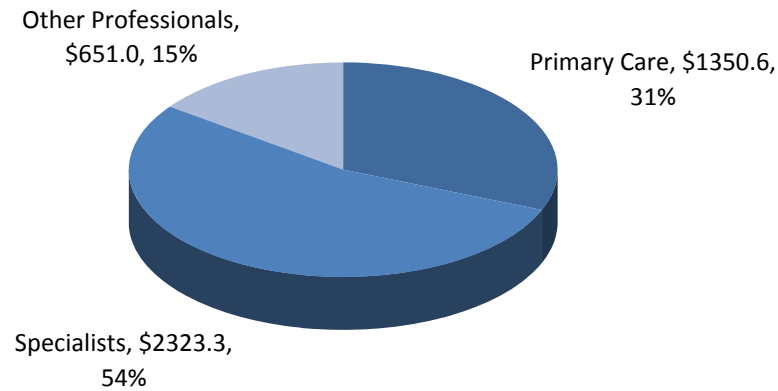
**Figure III.C.5: Price Variation for Selected Outpatient Services in Hospitals and Free-Standing Clinics, 2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: CPT codes are used for grouping the procedures. Data include only facility charges. Percentiles are calculated and compared by carrier; the highest 95th percentile and the lowest 5th percentile are presented, together with average price across all carriers. Emergency room and all other outpatient hospital visits are included in the "hospitals" category. Ambulatory care centers, urgent care facilities, independent clinics, birthing centers, and comprehensive outpatient rehab facilities are included in the "free-standing facilities" category.

**Figure D.1: Total Spending for Privately Insured Physician and Other Professional Services  
by Type of Provider, 2008 (\$ millions)**

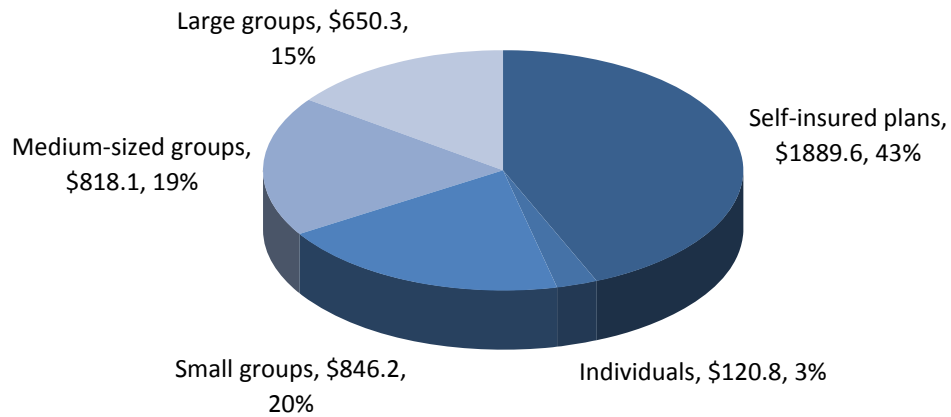


Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include professional charges only. Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists includes all other MDs. Other professionals include all other nurses, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, etc., as well as professional charges where the provider type is unknown. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments not captured in the claims data.



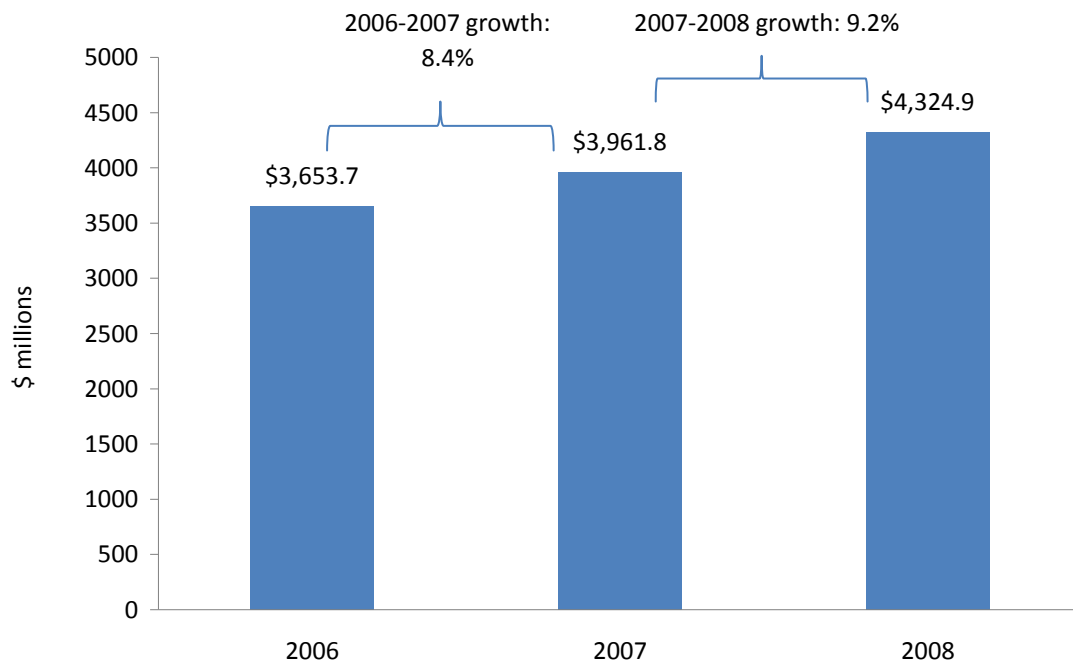
**Figure D.2: Total Spending for Privately Insured Physician and Other Professional Services  
by Insurance Market Sector, 2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include professional charges only. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments not captured in the claims data.

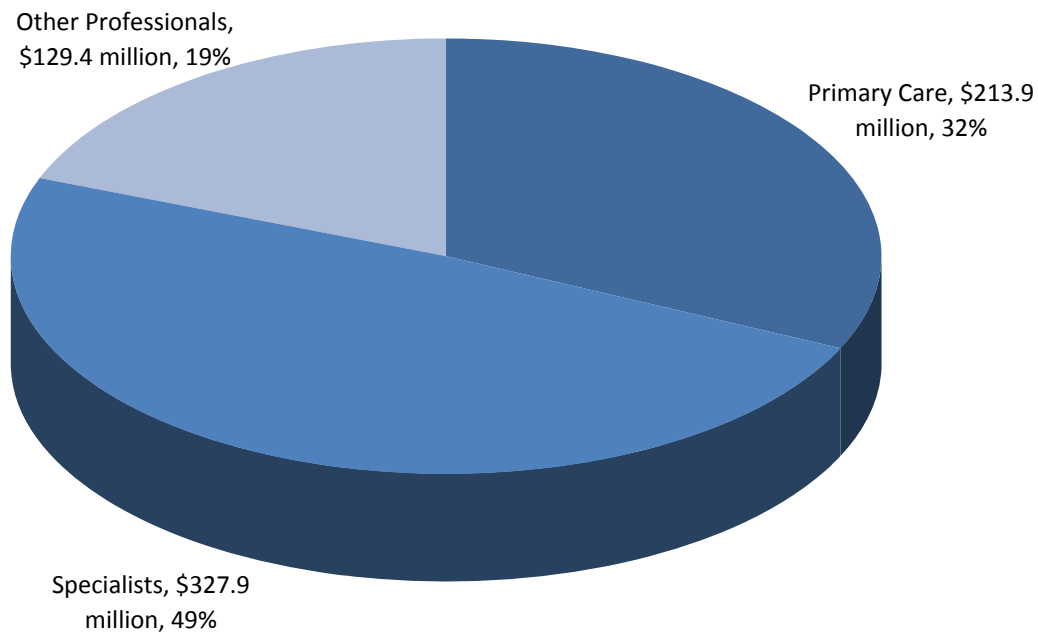
**Figure D.3. Total Spending for Physician and Other Professional Services and Annual Percent Change, 2006-2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts. Notes: Data include professional charges only. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments not captured in the claims data.

**Figure D.4: Change in Total Spending for Privately Insured Physician and Other Professional Services  
by Type of Provider, 2006-2008**

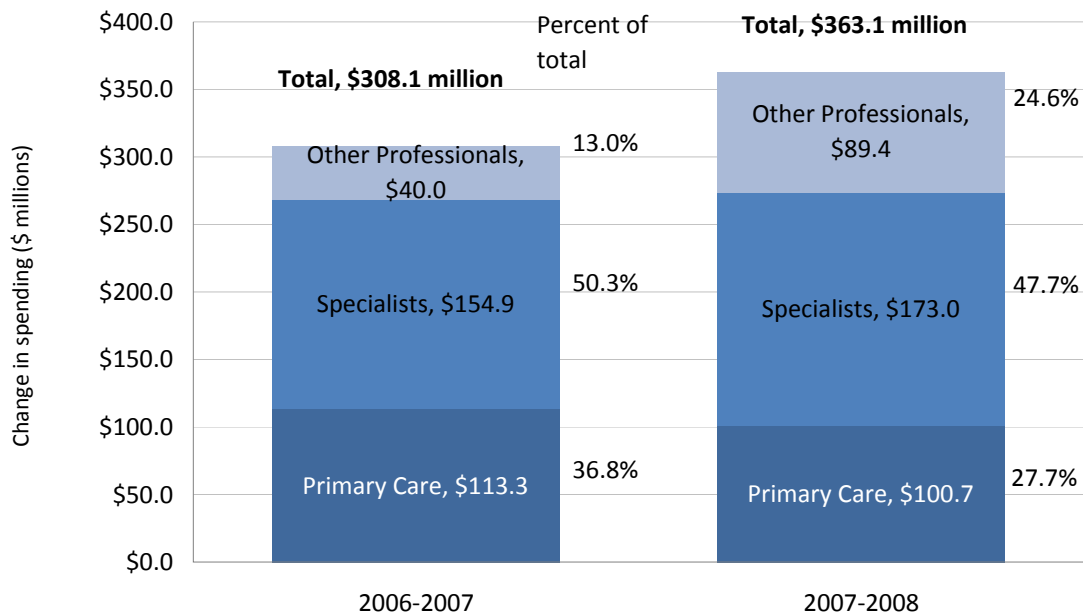
**Total change in spending for physician and other professional services: \$671.2 million**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include professional charges only. Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists includes all other MDs. Other professionals include all other nurses, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, etc., as well as professional charges where the provider type is unknown. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure D.4.a: Annual Change in Total Spending for Privately Insured Physician and Other Professional Services  
by Type of Provider, 2006-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include professional charges only. Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists includes all other MDs. Other professionals include all other nurses, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, etc., as well as professional charges where the provider type is unknown. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Table D.1: Spending per Member Year for Privately Insured Physician and Other Professional Services by Insurance Market Sector, 2006-2008**

	All plans	Fully-insured				Self-insured plans
		Individuals	Small groups	Medium-sized groups	Large groups	
2006	\$1,239	\$1,567	\$1,198	\$1,166	\$1,230	\$1,292
2007	\$1,344	\$1,668	\$1,295	\$1,263	\$1,341	\$1,399
2008	\$1,475	\$1,716	\$1,397	\$1,368	\$1,474	\$1,554
Percent change 2006-2008	19.1%	9.5%	16.6%	17.3%	19.8%	20.3%
2006-2007	8.4%	6.4%	8.1%	8.3%	9.0%	8.3%
2007-2008	9.8%	2.9%	7.9%	8.3%	10.0%	11.0%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments not captured in the claims data.

**Table D.2: Components of Change in Spending per Member Year for Privately Insured Physician and Other Professional Services by Type of Service, 2006-2008**

	Spending for Physician and Other Professional Services per Member Year	Average Spending per Service	Number of Services per Member Year
<b>Total Professional services</b>			
2008	\$1,475	\$99	15.0
Percent change, 2006-2008	19.1%	9.8%	8.5%
2006-2007	8.4%	4.7%	3.6%
2007-2008	9.8%	4.8%	4.8%
<b>Primary Care</b>			
2008	\$461	\$80	5.8
Percent change, 2006-2008	19.5%	10.8%	7.9%
2006-2007	10.0%	5.7%	4.0%
2007-2008	8.7%	4.8%	3.7%
<b>Specialty</b>			
2008	\$793	\$142	11.5
Percent change, 2006-2008	17.1%	9.8%	6.6%
2006-2007	7.8%	5.2%	2.4%
2007-2008	8.7%	4.4%	4.1%
<b>Other Professionals</b>			
2008	\$222	\$61	3.6
Percent change, 2006-2008	25.6%	11.8%	12.3%
2006-2007	7.7%	3.0%	4.5%
2007-2008	16.6%	8.5%	7.5%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Primary care includes general practitioners, family practitioners, internists, OB/GYNs, pediatricians, geriatricians, as well as physicians classified as practicing public health and general preventive medicine and adolescent medicine, and nurse practitioners. Specialists includes all other MDs. Other professionals include all other nurses, midwives, podiatrists, therapists, psychologists, chiropractors, dentists, nutritionists, dentists, etc., as well as professional claims where the provider type is unknown. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Since services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. (Injectable drugs, among other services, are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of services provided.

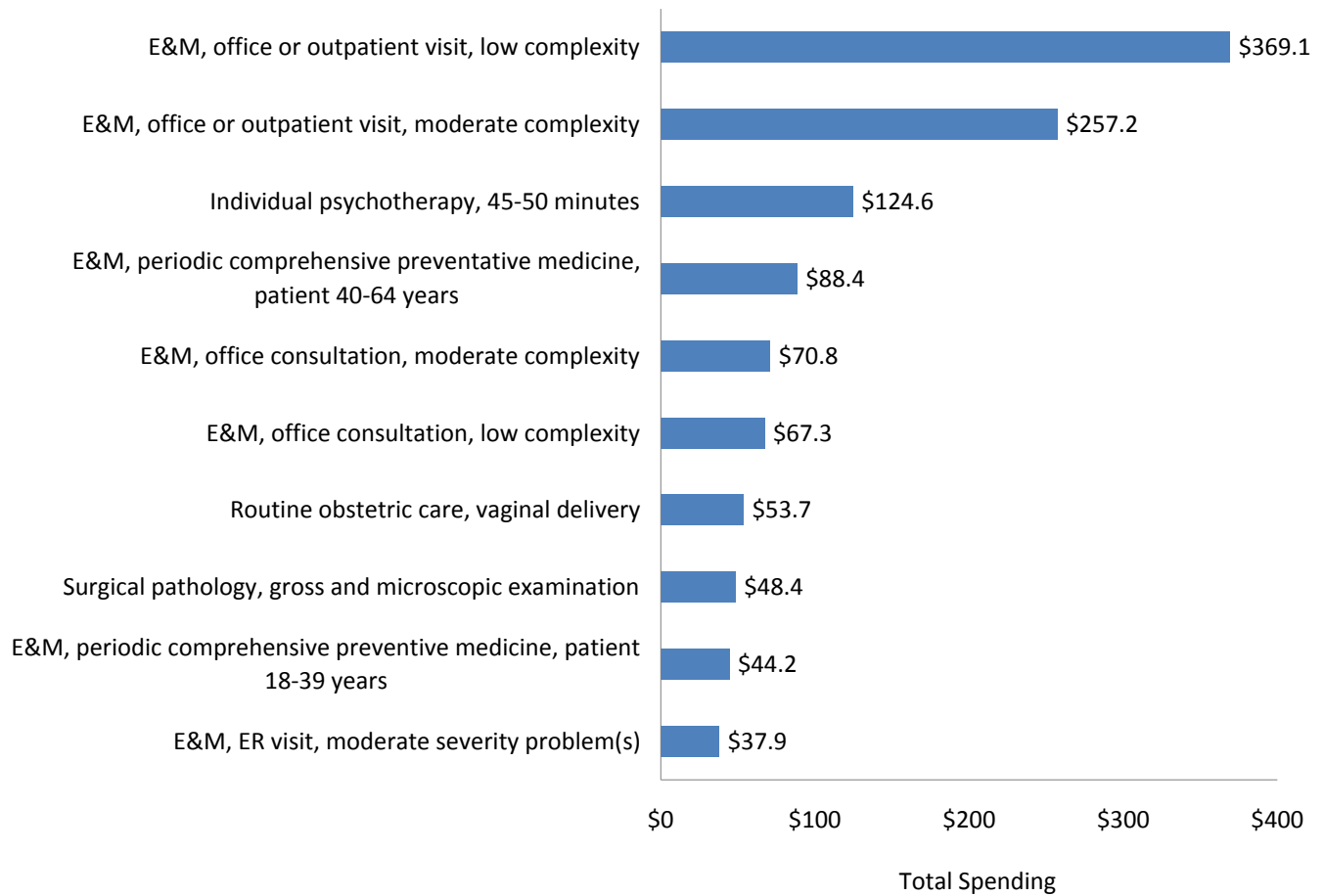
**Table D.3: Components of Change in Spending per Member Year for Privately Insured Physician and Other Professional Services by Insurance Market Sector, 2006-2008**

	Spending for Physician and Other Professional Services per Member Year	Average Spending per Service	Number of Services per Member Year
<b>Fully-insured plans</b>			
Individuals			
2008	\$1,716	\$103	16.6
Percent change, 2006-2008	9.5%	8.4%	1.0%
2006-2007	6.4%	3.7%	2.6%
2007-2008	2.9%	4.5%	-1.6%
Small groups			
2008	\$1,397	\$96	14.5
Percent change, 2006-2008	16.6%	9.5%	6.4%
2006-2007	8.1%	5.0%	2.9%
2007-2008	7.9%	4.3%	3.4%
Medium-sized groups			
2008	\$1,368	\$96	14.2
Percent change, 2006-2008	17.3%	9.2%	7.4%
2006-2007	8.3%	4.6%	3.5%
2007-2008	8.3%	4.3%	3.8%
Large groups			
2008	\$1,474	\$96	15.3
Percent change, 2006-2008	19.8%	9.3%	9.7%
2006-2007	9.0%	4.6%	4.2%
2007-2008	10.0%	4.5%	5.3%
<b>Self-insured plans</b>			
2008	\$1,554	\$102	15.3
Percent change, 2006-2008	20.3%	9.9%	9.5%
2006-2007	8.3%	4.6%	3.6%
2007-2008	11.0%	5.0%	5.7%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Since services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. (Injectable drugs, among other services, are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of services provided.

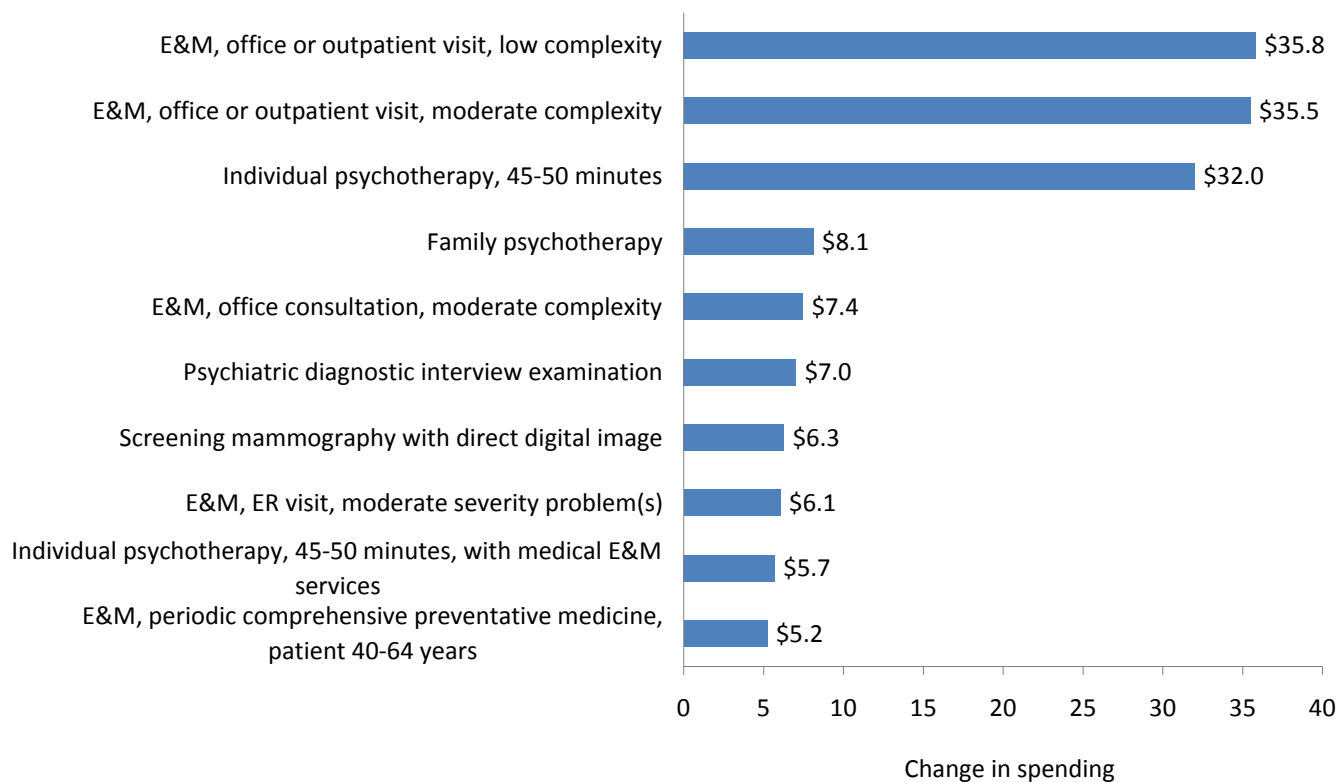
**Figure D.5: Selected Services Accounting for the Highest Total Spending for Privately Insured Professional Services, 2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts. Notes: Data include professional charges only. Certain claims (representing 14 percent of all professional claims in 2008) are excluded. See the methods appendix for details.



**Figure D.6: Selected Services Accounting for the Largest Growth in Spending for Privately Insured Physician and Other Professional Services, 2007-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include professional charges only. Certain claims (representing 14 percent of all professional claims in 2008) are excluded. See the methods appendix for details.

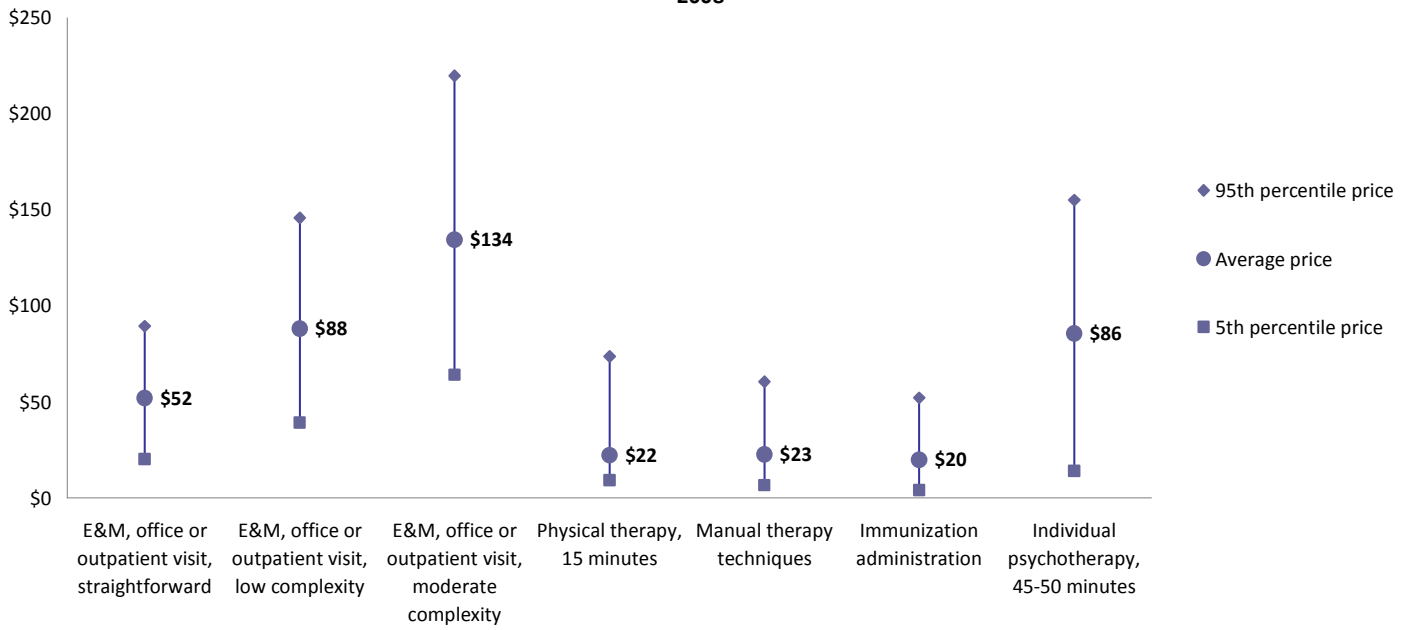
**Table D.4: Drivers of Change in Spending for Privately Insured Physician and Other Professional Services, 2006-2007**

	Change in Spending	Change in spending due to the change in:		
		Price	Number of Service Units	Service Mix
All market basket professional services (\$ millions)	\$253.8	\$279.5	\$61.7	-\$87.4
Percent of expenditure change	100.0%	110.1%	24.3%	-34.4%
Contribution to total change (in percentage points)	7.9%	8.7%	1.9%	-2.7%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

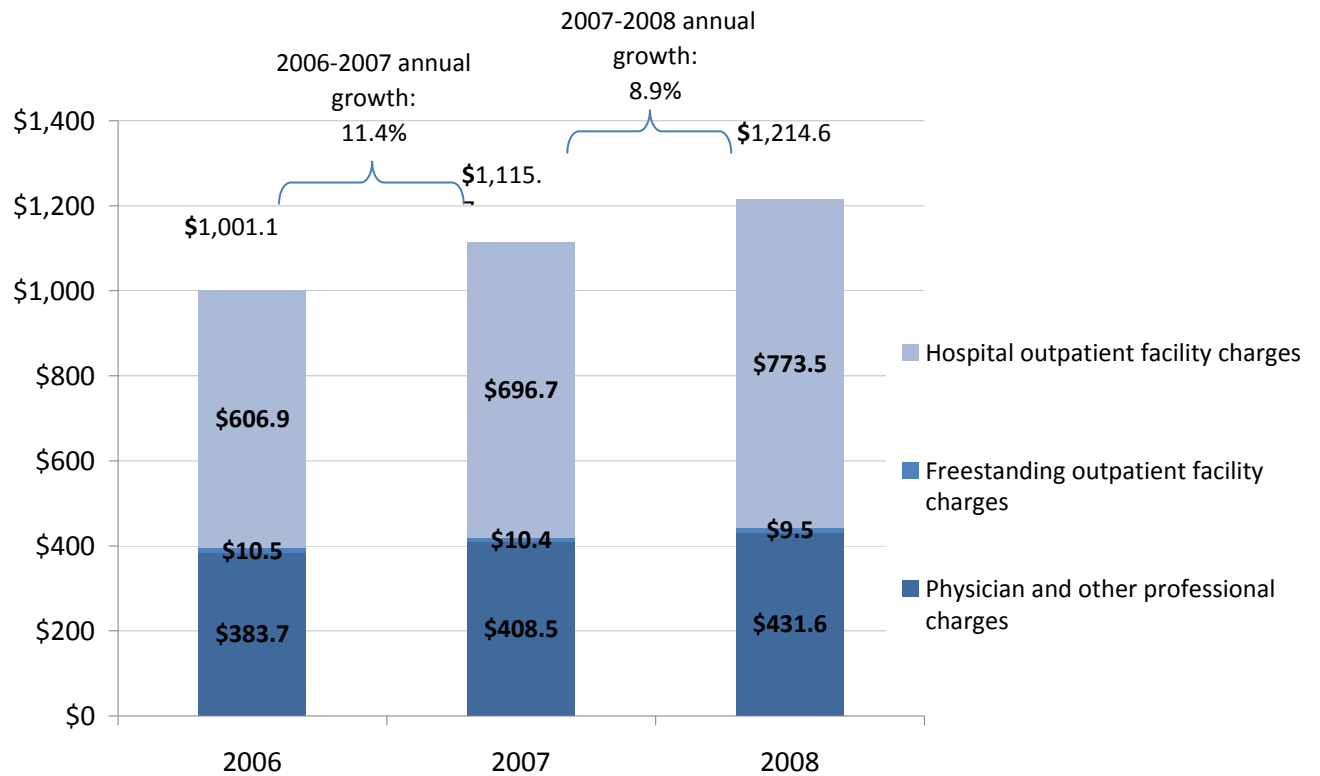
Notes: Data include physician and other professional charges in any location of service (inpatient, outpatient hospital, free-standing facilities, offices, clinics and all other locations). The number of service units on a claim corresponds to the number of times the service or procedure billed for was performed. The change in the number of service units combines change in the number of insured member months, change in number of services pmpm, and change in the number of service units per service. Using service units rather than services as a measure of volume controls for differences in the amount of care billed on a single claim. (Injectable drugs, among other services, are often billed on a single claim where the number of service units corresponds to the amount of drug administered.) Certain claims are excluded. See the methods appendix for details.

**Figure III.D.7: Price Variation for Selected High-Frequency Privately Insured Physician and Other Professional Services, 2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.  
 Notes: Data include professional charges only. See the methods appendix for details/

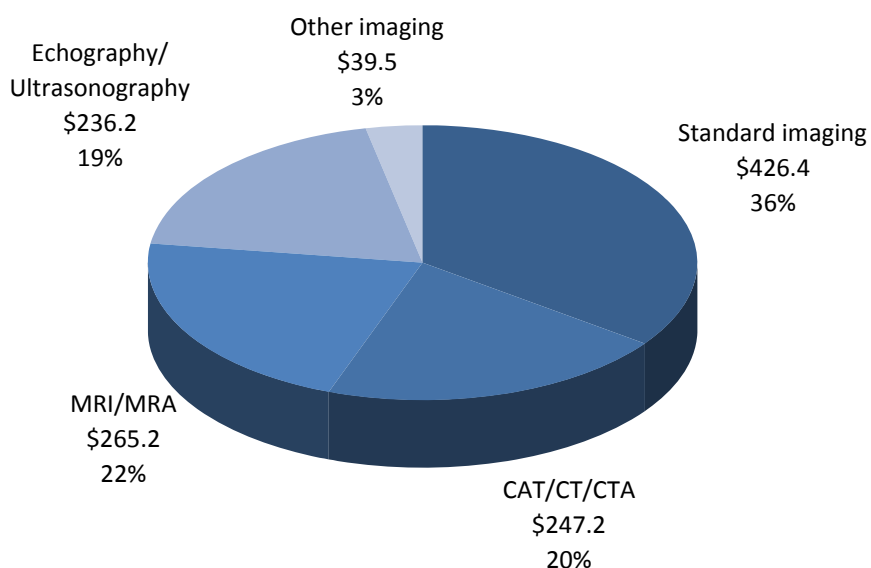
**Figure E.1: Total Spending for Privately Insured Imaging Services by Type of Provider, 2006-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Spending excludes facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure E.2: Percent of Total Spending for Privately Insured Imaging Services  
by Type of Service, 2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest privatehealth insurance carriers in Massachusetts.

Notes: Spending includes payments for outpatient facilities and professional services. Facility charges for imaging provided during an inpatient stay are excluded; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

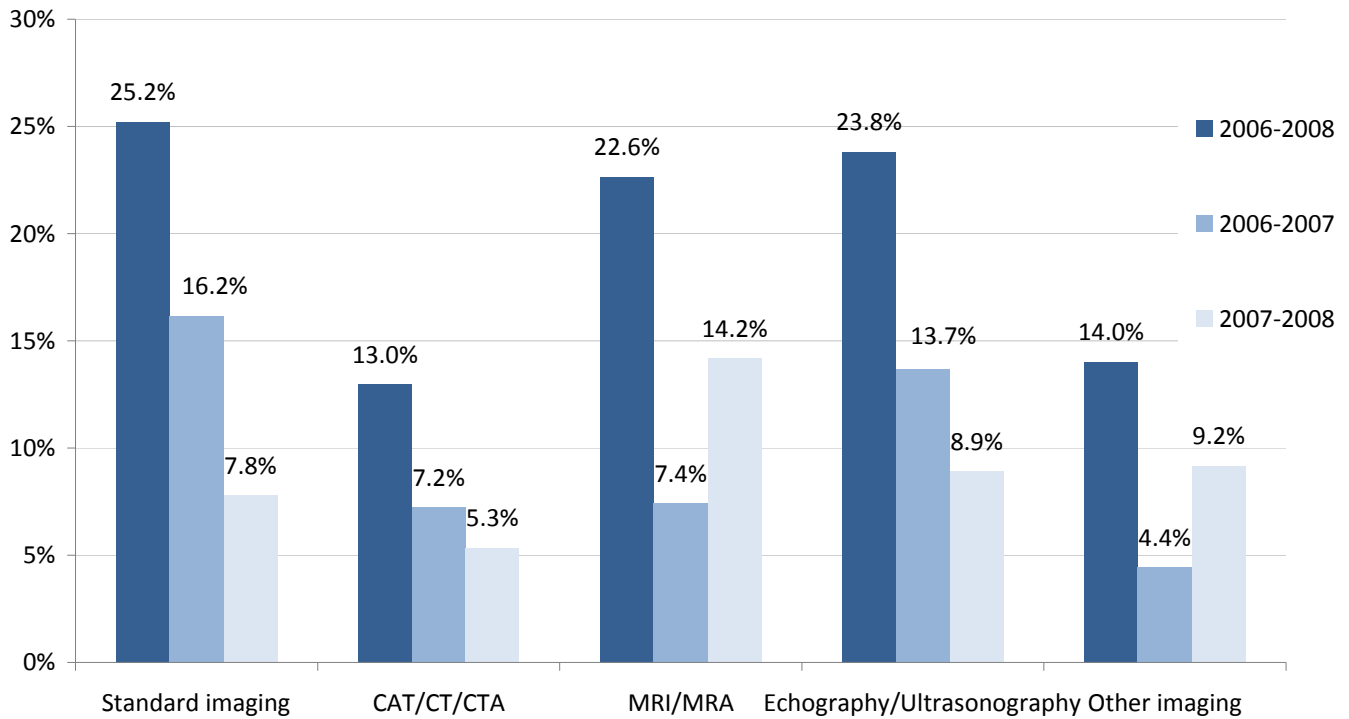
**Table E.1: Outpatient Facility Charges and Professional Services Charges as a Percent of Total Spending for Privately Insured Imaging, 2006-2008**

	Total spending for imaging services (\$ millions)	Outpatient Facility Charges		Physician and Other Professional Charges	
		Total spending (\$ millions)	Percent of total spending	Total spending (\$ millions)	Percent of total spending
2006	\$1,001.1	\$617.4	61.7%	\$383.7	38.3%
2007	\$1,115.7	\$707.1	63.4%	\$408.5	36.6%
2008	\$1,214.6	\$783.0	64.5%	\$431.6	35.5%
Percent change 2006-2008	21.3%	26.8%	na	12.5%	na
2006-2007	11.4%	14.5%	2.8%	6.5%	-4.5%
2007-2008	8.9%	10.7%	1.7%	5.7%	-2.9%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Outpatient facilities include hospitals and other freestanding outpatient facilities. Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

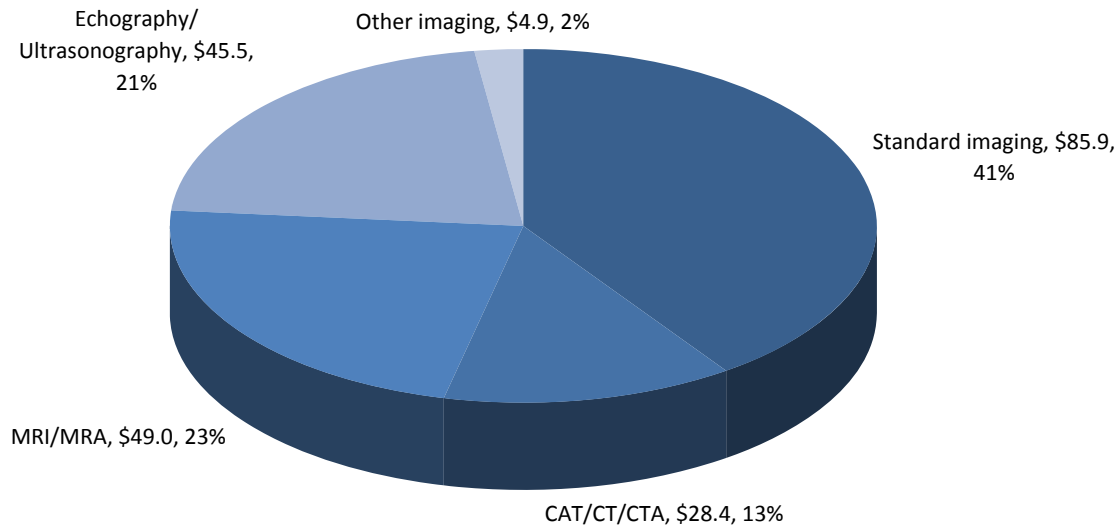
**Figure E.3: Annual Rates of Growth in Spending for Outpatient Imaging Services by Type of Service, 2006-2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Outpatient facilities include hospitals and other freestanding outpatient facilities. Spending exclude sfacility charges for imaging provided during an inpatient stay; imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Figure E.4: Distribution of the Change in Total Spending for Privately Insured Imaging Services by Type of Service, 2006-2008**

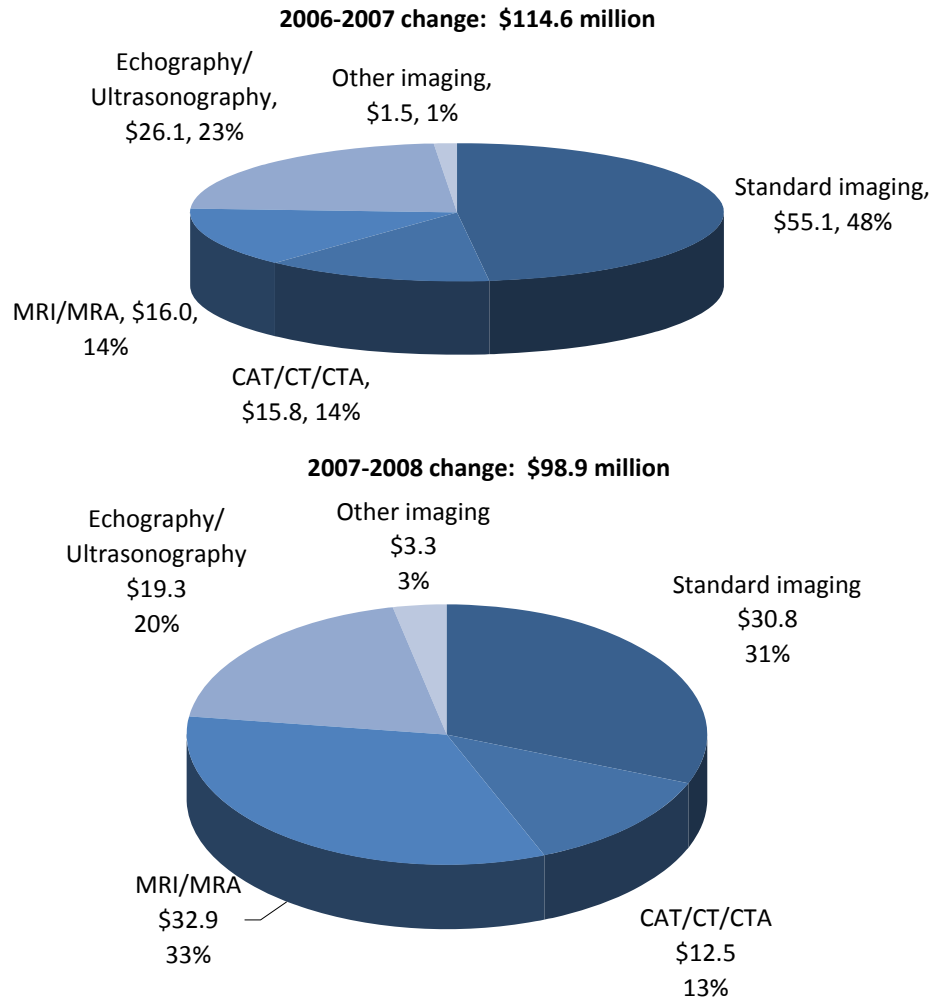


Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Outpatient facilities include hospitals and other freestanding outpatient facilities. Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.



**Figure E.4a: Distribution of the Annual Change in Spending for Privately Insured Imaging Services by Type of Service, 2006-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Outpatient facilities include hospitals and other freestanding outpatient facilities.

Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data.

**Table E.2: Components of Change in Outpatient Facility Charges per Member Year for Privately Insured Imaging Services by Type of Service, 2006-2008**

	Spending per Member Year	Spending per Service	Number of Services per Member Year
<b>All Imaging</b>			
2008	\$267	\$256	1.04
Percent change 2006-2008	27.6%	14.1%	11.8%
2006-2007	14.5%	7.3%	6.8%
2007-2008	11.4%	6.4%	4.7%
<b>Standard Imaging</b>			
2008	\$97	\$149	0.65
Percent change 2006-2008	37.2%	23.3%	11.3%
2006-2007	24.6%	17.2%	6.3%
2007-2008	10.1%	5.2%	4.7%
<b>CAT/CT/CTA</b>			
2008	\$62	\$502	0.12
Percent change 2006-2008	13.6%	2.5%	10.8%
2006-2007	6.0%	-0.6%	6.6%
2007-2008	7.1%	3.1%	3.9%
<b>MRI/MRA</b>			
2008	\$56	\$1,157	0.05
Percent change 2006-2008	30.1%	-4.1%	35.5%
2006-2007	8.3%	-7.8%	17.4%
2007-2008	20.1%	4.0%	15.5%
<b>Echography/ Ultrasonography</b>			
2008	\$43	\$230	0.19
Percent change 2006-2008	30.5%	20.0%	8.7%
2006-2007	18.2%	12.2%	5.4%
2007-2008	10.4%	7.0%	3.2%
<b>Other Imaging</b>			
2008	\$9	\$306	0.03
Percent change 2006-2008	12.8%	-2.4%	15.5%
2006-2007	2.8%	-8.3%	12.1%
2007-2008	9.7%	6.4%	3.1%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Outpatient facilities include hospitals and other freestanding outpatient facilities. Expenditures exclude facility charges for imaging provided during an inpatient stay; inpatient imaging services are typically included in DRG payments and not billed separately. Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Because services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of imaging services provided. The number of services was adjusted for missing data in 2007 and 2008. See the methods appendix for additional details.

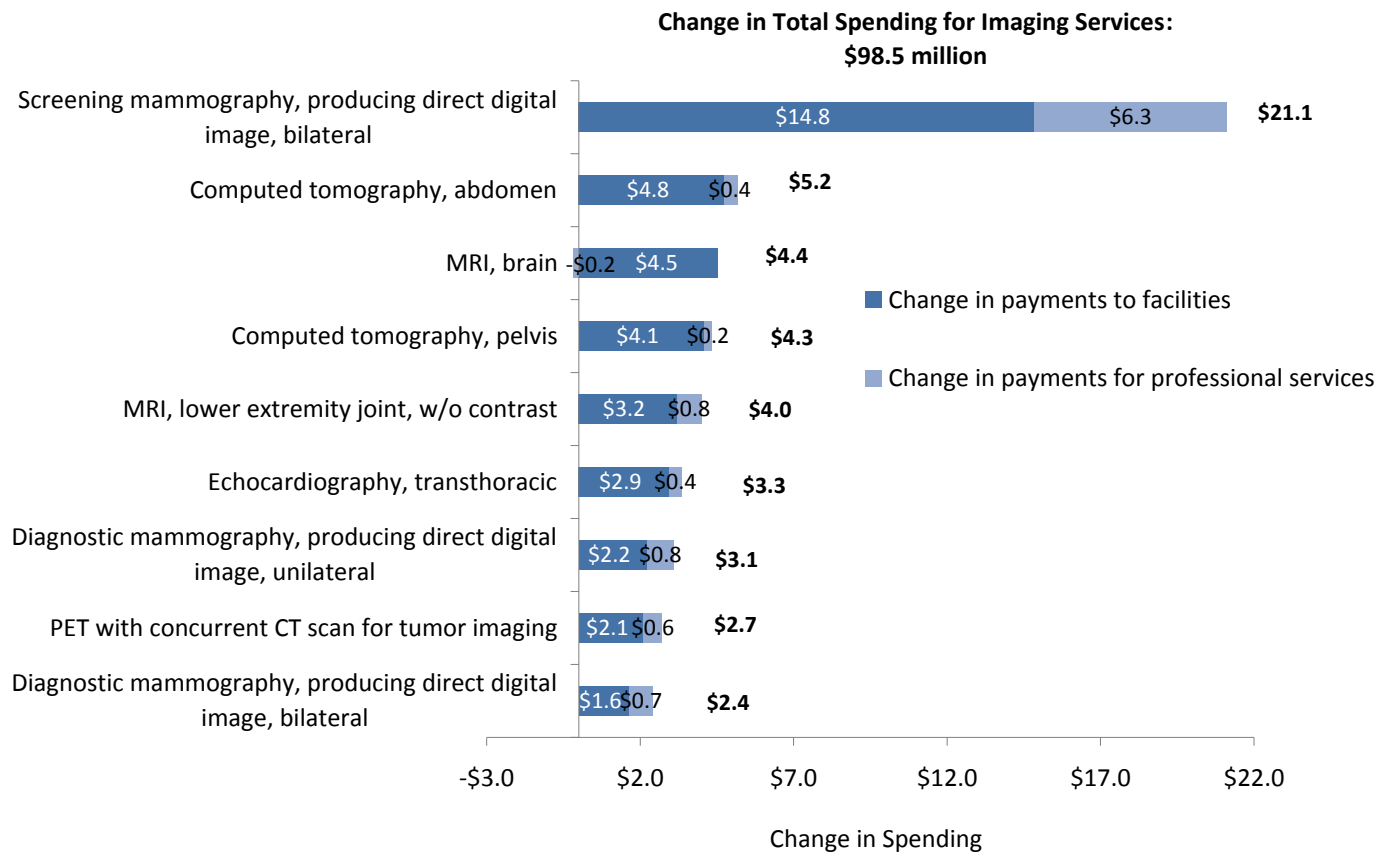
**Table E.3: Components of Change in Spending for Physician and Other Professional per Member Year for Privately Insured Imaging Services by Type of Service, 2006-2008**

	Spending per Member Year	Spending per Service	Number of Services per Member Year
<b>All Imaging</b>			
2008	\$147	\$77	1.90
Percent change 2006-2008	13.2%	5.0%	7.8%
2006-2007	6.5%	2.3%	4.1%
2007-2008	6.3%	2.6%	3.5%
<b>Standard Imaging</b>			
2008	\$48	\$44	1.10
Percent change 2006-2008	8.2%	1.4%	6.7%
2006-2007	2.8%	-0.7%	3.5%
2007-2008	5.2%	2.1%	3.1%
<b>CAT/CT/CTA</b>			
2008	\$23	\$128	0.18
Percent change 2006-2008	13.8%	7.7%	5.7%
2006-2007	10.6%	4.9%	5.4%
2007-2008	2.9%	2.6%	0.3%
<b>MRI/MRA</b>			
2008	\$34	\$307	0.11
Percent change 2006-2008	13.8%	3.3%	10.2%
2006-2007	6.2%	2.5%	3.6%
2007-2008	7.2%	0.8%	6.3%
<b>Echography/ Ultrasonography</b>			
2008	\$38	\$82	0.46
Percent change 2006-2008	18.5%	7.6%	10.2%
2006-2007	9.2%	4.0%	4.9%
2007-2008	8.6%	3.4%	5.0%
<b>Other Imaging</b>			
2008	\$4	\$82	0.05
Percent change 2006-2008	19.6%	4.5%	14.4%
2006-2007	8.6%	1.8%	6.7%
2007-2008	10.1%	2.7%	7.2%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Capitated claims are valued at their fee-for-service equivalents. Estimates include capitated claims but exclude capitation adjustments and other payments that are not captured in the claims data. Because services are defined at the claims line level, the number of services per member month does not capture changes in the volume of service units included on a single claim. As a result, increases in the average expenditure per service may capture increases in the price per service unit, increases in the number of service units per claim line, or a change in the mix of imaging services provided. The number of services was adjusted for missing data in 2007 and 2008. See the methods appendix for details.

**Figure E.5 Selected Services Accounting for Largest Growth in Total Spending for Privately Insured Imaging Services, 2007-2008 (\$ millions)**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include both facility charges for outpatient care and all physician charges where the procedure code indicated an imaging service. Certain claims (representing 20 percent of total imaging expenditures in 2008) are excluded. See the

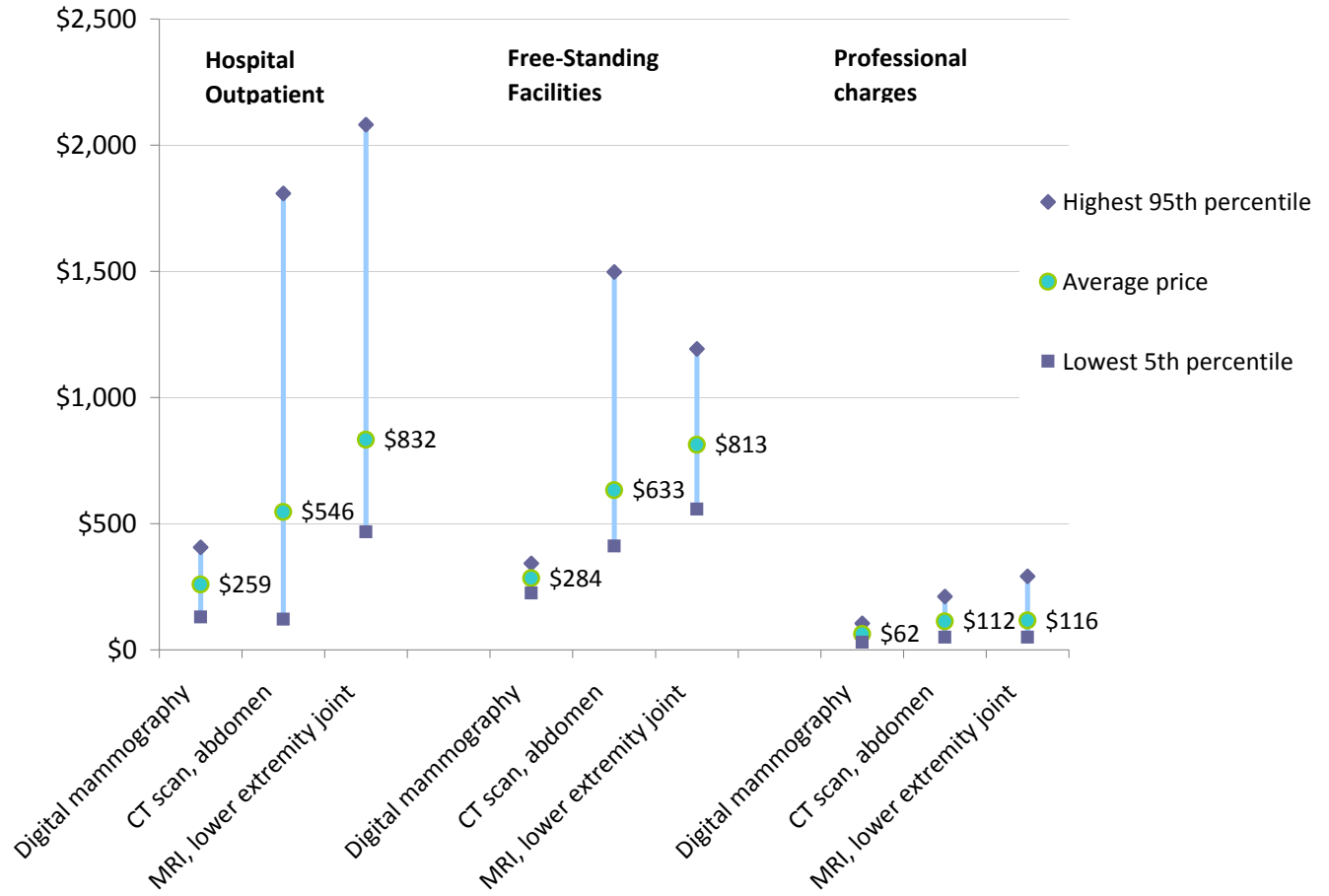
**Table III.E.4. Drivers of Change in Total Expenditures for Privately Insured Imaging Services, 2006-2007**

	Change in Total Expenditures	Change in total expenditures attributable to change in:		
		Price	Number of Service Units	Service Mix
All market basket imaging services (in millions)	\$103.6	\$48.4	\$63.0	-\$7.8
Facility charges	\$79.6	\$33.4	\$55.1	-\$8.9
Professional charges	\$24.1	\$15.0	\$7.9	\$1.2
Percent of total change, all market basket imaging services	100.0%	46.7%	60.8%	-7.5%
Contribution to total change (in percentage points)	12.9%	6.0%	7.9%	-1.0%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Data include both facility charges for outpatient care and all physician charges where the procedure code indicated an imaging service. Data exclude facility charges for imaging provided during an inpatient stay, as inpatient imaging services typically are included in DRG payments and not billed separately. The number of service units on a claim corresponds to the number of times the service or procedure billed for was performed. The change in the number of service units combines change in the number of insured member months, change in number of services pmpm, and change in the number of service units per service. Using service units rather than services as a measure of volume controls for differences in the amount of care billed on a single claim. Certain claims are excluded. See the methods appendix for additional details.

**Figure E.6: Price Variation of Facility Charges for Selected Imaging Services, 2008**



Source: Mathematica Policy Research analysis of claims data for Massachusetts residents, submitted by the six largest private health insurance carriers in Massachusetts.

Notes: Percentiles are calculated and compared by carrier, and only the highest 95th percentile and the lowest 5th percentile are presented, together with average price across all carriers. Digital mammography was identified by CPT code G0202; CT scan of the abdomen by code 74160; and MRI of lower extremity joint by code 73721. Professional charges include only claims with the CPT modifier 26, indicating the charge was only for the professional component of the imaging service.

**Table F.1. Percent of Index Admissions that Resulted in Readmission Within 30 Days, by Medical and Surgical Index Hospitalizations and Index Hospital Teaching Status, 2007**

	Readmissions as a percent of index hospitalizations in:		
	All hospitals	Teaching hospitals	Non-teaching hospitals
All index hospitalizations	6.8%	7.6%	6.1%
Medical	7.8%	9.0%	6.9%
Surgical	5.5%	6.2%	4.7%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents submitted by three private health insurance carriers in Massachusetts.

Notes: Estimates include all-cause readmissions, based on in-state hospitalizations only. Inpatient claims missing date of discharge are excluded. Analyses are not risk-adjusted.

**Table F.2. Spending per Member Year for Readmissions within 30 Days, by Medical and Surgical Index Hospitalizations and Index Hospital Teaching Status, 2007**

	Spending per member year	Percent after index hospitalization in:	
		Teaching hospitals	Non-teaching hospitals
All index hospitalizations	\$49	63.0%	37.0%
Medical	\$32	60.3%	39.7%
Surgical	\$17	68.3%	31.7%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents submitted by three private health insurance carriers in Massachusetts.

Notes: Estimates include all-cause readmissions, based on in-state hospitalizations only. Inpatient claims missing date of discharge are excluded. Analyses are not risk-adjusted.



**Table F.3. Selected Medical and Surgical DRGs with the Highest Readmission Rates, 2007**

Index DRG	Description	Number of index admissions	Number of readmissions	Readmissions as a percent of index admissions	Percent of all index admissions <sup>a</sup>	Percent of all readmissions <sup>b</sup>
<b>Total, top 5 medical and surgical DRGs</b>		5,857	647	11.0%	5.8%	9.4%
<b>Medical</b>						
552	DIGEST SYST DISORD EXCEPT ESOPH,GASTROENT & UNCOMPL ULCERS W	508	75	14.8%	0.9%	1.7%
543	CIRC DISORDERS EXCEPT AMI, ENDOCARDITIS, CHF & ARRHYTHMIA W	469	56	11.9%	0.9%	1.3%
179	INFLAMMATORY BOWEL DISEASE	642	65	10.1%	1.2%	1.5%
127	HEART FAILURE & SHOCK	702	70	10.0%	1.3%	1.6%
541	SIMP PNEUM & OTH RSP DIS X BR,ASTH W MCC	874	86	9.8%	1.6%	2.0%
Total: Top 5 medical DRGs		3,195	352	11.0%	5.8%	8.2%
<b>Surgical</b>						
1	CRANIOTOMY AGE >17 W CC	380	49	12.9%	0.8%	1.9%
550	OTHER VASCULAR PROCEDURES W MAJOR CC	499	64	12.8%	1.1%	2.5%
585	MAJOR STOMACH,ESOPHAGEAL,DUODENAL,SMALL & LARGE BOWEL PROC W	454	55	12.1%	1.0%	2.1%
558	MAJOR MUSCULOSKELETAL PROCEDURES W MCC	361	37	10.2%	0.8%	1.4%
148	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC	968	90	9.3%	2.1%	3.5%
Total: Top 5 surgical DRGs		2,662	295	11.1%	5.8%	11.5%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents submitted by three private health insurance carriers in Massachusetts.

Notes: Estimates include all-cause readmissions, based on in-state hospitalizations only. Inpatient claims missing date of discharge are excluded. Analyses are not risk-adjusted.

<sup>a</sup> Percent of all index admissions for the top 5 medical DRGs is calculated on all medical DRG index admissions. Similarly, percent of all index admissions for top 5 surgical DRGs is calculated on all surgical DRG index admissions, and the sum of the top 5 medical and top 5 surgical DRGs as a percent of all index admissions (last row) is calculated on all medical and surgical DRG index admissions.

<sup>b</sup> Percent of all readmissions for top 5 medical DRGs calculated on all medical DRG readmissions. Similarly, percent of all readmissions for top 5 surgical DRGs calculated on all surgical DRG readmissions, and percent of all readmissions for the sum of the top 5 medical and top 5 surgical (last row) calculated on all medical and surgical DRG readmissions

**Table F.4. Most Frequent Readmission DRGs Associated with the Top 5 Medical and Surgical DRGs, 2007**

Index DRG	Description	Readmission DRG	Description	Percent of Readmissions
<b>Medical</b>				
552	DIGEST SYST DISORD EXCEPT ESOPH,GASTROENT & UNCOMPL ULCERS W	552	DIGEST DIS EX ESOP,GASTR,UNC ULCER W MCC	16.2
		148	MAJOR SMALL & LARGE BOWEL PROC W CC	6.8
543	CIRC DISORDERS EXCEPT AMI, ENDOCARDITIS, CHF & ARRHYTHMIA W	543	CIRC DIS EX AMI,ENDOCARD,CHF,ARRHY W MCC	12.7
		478	OTHER VASCULAR PROCEDURES W CC	5.5
179	INFLAMMATORY BOWEL DISEASE	179	INFLAMMATORY BOWEL DISEASE	46.2
		148	MAJOR SMALL & LARGE BOWEL PROC W CC	9.2
127	HEART FAILURE & SHOCK	127	HEART FAILURE & SHOCK	26.1
		88	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	5.8
		124	CIRC DIS EX AMI W CARD CATH & COMPLX DX	5.8
		316	RENAL FAILURE	5.8
		541	SIMP PNEUM & OTH RSP DIS X BR,ASTH W MCC	5.8
541	SIMP PNEUM & OTH RSP DIS X BR,ASTH W MCC	541	SIMP PNEUM & OTH RSP DIS X BR,ASTH W MCC	10.5
		89	SIMPLE PNEUMONIA,PLEURISY AGE >17 W CC	7.0
<b>Surgical</b>				
1	CRANIOTOMY AGE >17 W CC	1	CRANIOTOMY AGE >17 W CC	16.3
		78	PULMONARY EMBOLISM	8.2
550	OTHER VASCULAR PROCEDURES W MAJOR CC	143	CHEST PAIN	7.8
		127	HEART FAILURE & SHOCK	6.3
585	MAJOR STOMACH, ESOPHAGEAL, DUODENAL, SMALL & LARGE BOWEL PROC W	552	DIGEST DIS EX ESOP,GASTR,UNC ULCER W MCC	10.9
		580	SYSTEM INFEC,PARASIT DIS EX SEPTIC W MCC	10.9
558	MAJOR MUSCULOSKELETAL PROCEDURES W MCC	543	CIRC DIS EX AMI,ENDOCARD,CHF,ARRHY W MCC	5.6
		560	MUSC DIS EX OSTEO,SEP ARTH,CON TIS W MCC	5.6
148	MAJOR SMALL & LARGE BOWEL PROCEDURES W CC	188	OTHER DIGESTIVE SYSTEM DX AGE >17 W CC	7.8
		418	POSTOPERATIVE & POST-TRAUMATIC INFECTION	7.8

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents submitted by three private health insurance carriers in Massachusetts.

Notes: Estimates include all-cause readmissions, based on in-state hospitalizations only. Inpatient claims missing date of discharge are excluded. Analyses are not risk-adjusted.

**Table F.5. Spending per Member Year for Readmissions within 30 Days for Medical and Surgical DRGs with the Highest Readmission Rates, by Hospital Teaching Status, 2007**

	Spending per member year	Percent after index hospitalization in:	
		Teaching hospitals	Non-teaching hospitals
All index hospitalizations (top 5 medical and surgical DRGs)	\$5	71.9%	28.1%
Medical DRGs (top 5)	\$3	72.5%	27.5%
Surgical DRGs (top 5)	\$2	71.0%	29.0%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents submitted by three private health insurance carriers in Massachusetts.

Notes: Estimates include all-cause readmissions, based on in-state hospitalizations only. Inpatient claims missing date of discharge are excluded. Analyses are not risk-adjusted.

**Table F.6. Percent of Index Admissions with a Physician Visit within 30 Days: All Medical and Surgical Index Hospitalizations and Medical and Surgical Index DRGs with the Highest Readmission Rates, by Hospital Teaching Status, 2007**

	Percent after index hospitalization in:		
	All hospitals	Teaching hospitals	Non-teaching hospitals
<b>Medical and Surgical Index Hospitalizations</b>			
Index hospitalizations with at least one readmission			
All medical and surgical index hospitalizations	65.5%	63.7%	67.5%
Top 5 medical and top 5 surgical index DRGs	64.6%	60.6%	70.3%
Index hospitalizations without readmission			
All medical and surgical index hospitalizations	72.8%	72.6%	73.0%
Top 5 medical and top 5 surgical index DRGs	78.6%	78.1%	79.1%
<b>Medical Index Hospitalizations</b>			
Index hospitalizations with at least one readmission			
All medical index hospitalizations	69.8%	67.3%	72.0%
Top 5 medical index DRGs	67.6%	62.5%	73.2%
Index hospitalizations without readmission			
All medical index hospitalizations	79.6%	79.0%	80.0%
Top 5 medical index DRGs	83.3%	82.7%	83.8%
<b>Surgical Index Hospitalizations</b>			
Index hospitalizations with at least one readmission			
All surgical index hospitalizations	58.4%	59.0%	57.4%
Top 5 surgical index DRGs	61.0%	58.9%	65.3%
Index hospitalizations without readmission			
All surgical index hospitalizations	64.8%	66.9%	62.4%
Top 5 surgical index DRGs	73.0%	73.9%	71.6%

Source: Mathematica Policy Research analysis of claims data for Massachusetts residents submitted by three private health insurance carriers in Massachusetts.

Notes: Estimates include all-cause readmissions, based on in-state hospitalizations only. Inpatient claims missing date of discharge are excluded. Analyses are not risk-adjusted.

## **Technical Appendix**

- A. Data Collection
- B. Data Cleaning
- C. Measures of Expenditure and Utilization
- D. Analysis of Expenditures and Utilization
- E. Decomposition and Price Variation
- F. Hospital Efficiency Analysis

## A. Data Collection

### Claims data

We requested each carrier submit files containing all pharmacy and medical claims with an incurred date between January 1, 2006 and December 31, 2008 for all of their enrollees with comprehensive medical benefits who were Massachusetts residents. The claims request covered all comprehensive private medical insurance products,<sup>1</sup> and included only enrollees who were Massachusetts residents covered by a Massachusetts policy. Each carrier provided claims for four service types: pharmacy, inpatient hospital, outpatient hospital, and all other medical.

Ten carriers provided data in sufficient time to include in the analysis. Of these, four carriers were dropped from the analysis for the following reasons:

- Two carriers were unable to provide data on the number of members enrolled each year by market segment, so that expenditure trends per member per month could not be calculated.
- One carrier provided files by paid date (not incurred date), omitting many claims that were incurred in the last months of 2008.
- One carrier was unable to identify the location of service (e.g., acute inpatient hospital, hospital outpatient) for hospital claims.

The remaining six carriers (Blue Cross Blue Shield, Fallon, Harvard Pilgrim Health Care, Neighborhood Health Plan, Tufts, and United), represented 91 percent of all self- and fully-insured lives reported by Massachusetts carriers in 2008.<sup>2</sup>

### Other payments for health care

The carriers also reported payments to providers that did not flow through their claims systems. These were reported in two major categories: capitation payments that correspond to encounter claims, and other payments (such as pay-for-performance withholds and bonuses) that do not correspond directly to service use.

All six of the carriers believed that their claims data included most or all encounters under capitation arrangements. Each carrier flagged these claims as capitated encounters and imputed an allowed amount equal to the fee-for-service (FFS) equivalent. These FFS equivalents assigned were used to estimate the cost of services by service and/or provider type. A capitation adjustment was calculated equal to the total capitation amounts that the carriers reported minus the sum of the fee-for-service equivalents for encounters incurred the same calendar year. The capitation adjustment is reported in the overview section, but could not be allocated meaningfully to single types of service (e.g., inpatient admissions). As a result, total and pmpm expenditures in the latter sections of this report may slightly underestimate the true cost of services.

Other payments not flowing through the claims system also are reported in the overview section. Like the capitation adjustment, these payments cannot be assigned to specific services or

beneficiaries and are not included in the more detailed estimates (by type of service or insurance market segment) reported in this report.

## B. Data Cleaning

Extensive data checks were performed to identify potential errors in reporting. These checks led to several carriers resubmitting new data files as well as programming adjustments to accommodate differences in how carriers' populated the data fields. We then contacted every carrier, provided key estimates from the data each had submitted, and confirmed that our estimates matched the carrier's own estimates.

To standardize claims by type of service, we referenced the provider type and location of service reported on each claim as shown in Technical Appendix Table 1. All claims were included in the overview of expenditures and utilization—including those that could not be assigned to the standardized inpatient, outpatient, or professional services categories. Thus, the overview estimates include not only inpatient, outpatient, and professional services, but also prescription drugs, skilled nursing and other non-acute institutional care, and "all other" services such as laboratory services, home health care, ambulance services, durable medical equipment, and other nonhospital services.

**Appendix Table 1**  
**Construction of Standardized Types of Service**

Standardized Type of Service	Carrier Data File	Reported Type of Provider	Reported Location of Service
Inpatient (Chapter 3.B)	Inpatient	Hospital	Inpatient hospital
Outpatient hospital (Chapter 3.C)	Outpatient	Hospital	Any <sup>3</sup>
Free-standing outpatient (Chapter 3.C)	Outpatient, Other medical	Not hospital, not physician or other professional	Urgent care facility, ambulatory surgical center, birthing center, independent clinic, or comprehensive outpatient rehabilitation facility
Professional services (Chapter 3.D)	All files	Physician or other professional	Any

Finally, different payment methods affected some carriers' ability to provide all of the requested data elements. Whenever possible, claims data with minor problems were retained in the analysis and dropped only from rows or columns on tables where the specific data problem prevented including them. This occurred in the following tables.

- One carrier's inpatient claims records did not include a discharge date. As a result, they were omitted from the calculations of average length-of-stay for hospital admissions and from the hospital readmissions analysis.
- Two carriers did not use a consistent DRG grouper across providers and/or across years. Their claims were dropped from the decomposition analysis of changes in inpatient hospital expenditures (see Technical Appendix Section D).

## C. Measure of Expenditure and Utilization

### Measuring expenditures

The expenditures captured in this report represent payments received by providers from carriers, patients, and any third-party payers (such as Medicare). Expenditures were measured as the sum of all allowed amounts, which reflect negotiated prices for each carrier and service provider. Both negative and positive allowed amounts were included, so that all expenditure amounts reflect corrected claim lines. In many cases, the allowed amount exceeded the carrier's paid amount, due to enrollee cost-sharing and third-party payments.

### Measuring utilization

The carriers provided claims data at the claim-line level. For all service types except inpatient hospitalizations, service use was measured at the claim-line level when the claim line contained both a service code (CPT or HCPC) and a non-negative allowed amount.

Considering only claim lines with non-negative allowed amounts, however, introduced the potential for double counting services. Due to the difficulty of matching records (carriers were not asked to report a claim ID, and generally did not), we were unable to match records with a negative allowed amount to the record it corrected. This introduced a trivial level of error in the utilization estimates: just 0.10 percent of outpatient claims had a negative allowed amount for which there may have been an offsetting claim (with a non-negative allowed amount); 0.07 percent of professional services claims had a negative allowed amount.

A BETOS grouper was used to aggregate services by service type, including:

- Evaluation and management
- Imaging
  - Standard imaging (e.g., x-rays)
  - MRIs
  - CAT/CT/CTA scans



- Echography/ultrasonography
- Other imaging
- Procedures (e.g., major cardiovascular procedures, procedures related to pregnancy and childbirth, oncology-related procedures, and ambulatory and other minor procedures)
- Other miscellaneous procedures and services (including lab tests and chemotherapy)

The unit of measurement for inpatient hospital care was a hospital admission. The line-item detail for each hospital stay was rolled up to the admission, using admission and discharge dates to sum claim lines as necessary. Admissions were classified into medical, surgical, and maternity or newborn care using the diagnosis-related group (DRG) on each claim.

In cases where the facility and physician submitted separate claims for the same outpatient visit or hospital admission, service use is counted in both the facilities sections (Sections B or C) and in the professional services section (Section D) of this report.

## **Expenditures and utilization incurred but not reported**

The claims for services other than prescription drugs reflected a nontrivial level of expense that was incurred but not reported (IBNR) as of March 2009. Therefore, to understand expenditure levels and trends, it was necessary to estimate completion factors for each service type.

Using a proprietary actuarial model, Oliver Wyman estimated expenditure completion factors by calendar year for 32 service types and subcategories as needed to support the estimates in Chapter 3. Oliver Wyman's model considers claims by incurred and paid month, and uses a conventional "chain ladder" analysis to estimate IBNR expenditures by incurred month. Actuarial judgment was used to adjust the initial estimates for outlier payments to avoid skewing estimates of future claims. The monthly IBNR estimates were used to develop completion factors that were applied to each calendar year of reported claims to estimate the total incurred expenditures by calendar year for 32 service types and subcategories.

Finally, it was necessary to estimate analogous completion factors for measures of utilization (hospital admissions, inpatient days, and outpatient and professional service use). We assumed that 2006 claims were effectively complete (consistent with Oliver Wyman's modeling results) and estimated completion factors for 2007 and 2008. Completion factors for 2007 were estimated as the percentage of services, admissions, or days incurred in 2006 that were reported by March 2008 (a 15 month run-out). Completion factors for 2008 were estimated as the percentage of claims incurred in 2006 that were reported by March 2007 (a 3-month run-out).

## **D. Analysis of Expenditures and Utilization**

### **Inpatient hospital**

Expenditures and utilization (admissions) were tabulated for each carrier by year, insurance market segment, and grouped DRG (medical, surgical, maternity and newborn care, or unknown).<sup>4</sup> All hospitalizations with a missing DRG (including hospitalizations for carriers that did not use DRGs) were categorized as unknown. Hospitals were classified as teaching or nonteaching by matching the provider names and/or ID to a list provided by the Division, supplemented with extensive web searches on the provider name.

### **Outpatient**

Expenditures and utilization were tabulated for each carrier by year, insurance market segment, and service type. For outpatient hospital services, expenditures and utilization were tabulated by hospital type (teaching or nonteaching) and location (Boston or all other areas).

### **Professional services**

Expenditures and utilization were tabulated for each carrier by year, insurance market segment, provider type, and service type. Physicians in general practice, family practice, internal medicine, obstetrics and gynecology, pediatrics, geriatric medicine, preventive medicine, public health and general preventive medicine, and adolescent medicine (as indicated in the provider type field) were flagged as primary care physicians, as were nurse practitioners. All other physicians were classified as specialists, and other non-physician professionals (e.g., nurses, chiropractors, therapists, social workers) were classified as “other providers.” Unknown provider type included physician providers identified as a “medical group practice.”

### **Imaging**

Imaging services include both a facilities component (charged by the facility or, in some cases, by the physician for use of radiological equipment) and a professional component (charged by the physician and other professionals who conduct or interpret the imaging). The analyses of outpatient and professional services include, respectively, payments to facilities and payments to physicians for imaging services.<sup>5</sup> However, the discussion of imaging services includes hospital outpatient and free-standing facility charges for imaging services, as well as professional charges across all locations of service (including inpatient, outpatient, offices and clinics, and labs). Facility charges for imaging services provided during an inpatient hospital stay are not separable from the DRG payment for the hospital stay and, therefore, are not included.

## **E. Decomposition and Price Variation Analysis**

This section describes the method for decomposing changes in total expenditures into the amounts attributable to changes in the average price per service, the number of services provided, and the mix of services delivered. Changes in medical expenditures were analyzed separately for (1) inpatient hospital, (2) outpatient hospital, (3) free-standing outpatient facilities, and (4) physician and professional services.<sup>6</sup>

### **Service market baskets**

Decomposing total expenditures entailed defining a consistent market basket of services that could be compared from year to year. In turn, to develop a market basket of services required some parsing of the claims data. First, claims with outlier values for the allowed amount were discarded,<sup>7</sup> as were all claims flagged as capitated or claims with missing or zero values for allowed amount, DRG or service code, or service units. To decompose inpatient spending separately for teaching and nonteaching hospitals, it was necessary to exclude claims for admissions to out-of-state hospitals or to hospitals where teaching status was unknown.

Second, to eliminate distortion that differences in IBNR would introduce, claims paid more than a certain number of months after the end of the year in which they were incurred were excluded. The decomposition of expenditure change between 2006 and 2007 used a 15-month run out (claims incurred in 2006 and paid by March 2008, and claims incurred in 2007 and paid by March 2009). The decomposition of expenditure change between 2007 and 2008 used a 3-month run out (claims incurred in 2007 and paid by March 2008, and claims incurred in 2008 and paid by March 2009).

For each service type of interest (inpatient hospital, outpatient hospital, free-standing outpatient facilities, and physician and professional services), a market basket of services in each category was defined as the services provided consistently in each comparison year. These services were then weighted by their utilization, averaged across all carriers and between comparison years.

While most services within a type of service are included in a market basket, some services did not occur in every year and, therefore, were omitted from the decomposition analyses. The decomposition included 71 percent of the total change in expenditures between 2006 and 2008 (Technical Appendix Table 2).

**Appendix Table 2**  
**Change in Expenditures for Market Basket Services as a Percent of**  
**Total Expenditure Change, 2006-2008**

	Change in expenditures for services in the analysis (millions)	Change in expenditures for services in the market basket (millions)	Market basket change as a percent of total change
All services	\$1,590	\$1,134	71.3%
Physician	\$671.2	\$496.4	74.0%
Outpatient hospital	\$637.1	\$472.8	74.2%
Inpatient	\$323.2	\$181.4	56.1%
Teaching	\$201.6	\$108.8	54.0%
Non-teaching	\$105.3	\$72.6	68.9%
Out-of-state	\$16.3	na	na
Free-standing outpatient	-\$41.6	-\$16.9	40.7%

Note: Decomposition analyses were not performed for pharmacy services, non-acute institutional services, and other non-hospital services.

## Decomposition calculations

For each service type, the change in expenditures for market-basket services from 2006 to 2007 and from 2007 to 2008 was decomposed into three components:

1. Additional expenditure due to changes in price. This amount was calculated as the change in total expenditures for the market basket, holding the number and type of services received constant.
2. Additional expenditure due to a change in the number of services delivered. This amount was calculated as the change in total expenditures for services in the market basket holding the price for each service and the mix of services constant, but allowing the quantity of each service (or admission type) to increase by the same percentage as the aggregate number of services (or admissions) increased during the year.
3. Additional expenditure due to a change in the service mix. This amount was calculated as the change in total expenditures for services in the market basket holding the price for each service and the total number of services constant, but allowing the distribution of services to change to reflect actual usage patterns in the end year.

The decomposition allocates the additional spending for each service or admission in each year as follows. Let  $S$  represent the number of different services (or hospital admissions) in a market basket. In period 1, each service is performed  $N^1$  times, and the average price for that service across all

providers is  $P^1$ . Similarly, in period 2, each service is performed  $N^2$  times, and the average price for that service across all providers is  $P^2$ :

Using this notation, the total change in cost is:

$$\begin{aligned}
 & \sum_{i=1}^S [(N_i^2 * P_i^2)] - \sum_{i=1}^S (N_i^1 * P_i^1) \\
 & \sum_{i=1}^S [(N_i^2 * P_i^2)] - \sum_{i=1}^S [(N_i^2 * P_i^1)] + \sum_{i=1}^S [(N_i^2 * P_i^1)] - \sum_{i=1}^S [(N_i^1 * P_i^2)] + \sum_{i=1}^S [(N_i^1 * P_i^2)] - \sum_{i=1}^S (N_i^1 * P_i^1) \\
 & \sum_{i=1}^S [(P_i^2] - P_i^1) * \frac{1}{2} * (N_i^{12} + N_i^2) + \sum_{i=1}^S [(N_i^2 - N_i^1) * \frac{1}{2} * (P_i^1 + P_i^2)] \\
 & \sum_{i=1}^S [(P_i^2] - P_i^1) * \frac{1}{2} * (N_i^1 + N_i^2) \quad \text{(The amount attributable to change in price)} \\
 & + \sum_{i=1}^S \left( N_i^2 - N_i^1 * \frac{\sum_{i=1}^S N_i^2}{\sum_{i=1}^S N_i^1} \right) * \frac{1}{2} * (P_i^1 + P_i^2) \quad \text{(The amount attributable to change in service mix)} \\
 & + \sum_{i=1}^S \left( N_i^1 * \frac{\sum_{i=1}^S N_i^2}{\sum_{i=1}^S N_i^1} - N_i^1 \right) * \frac{1}{2} * (P_i^1 + P_i^2) \quad \text{(The amount attributable to change in number of services)}
 \end{aligned}$$

Details of the calculations for each category of services are described below.

**Inpatient hospital services.** The unit of analysis was an inpatient stay for a specific DRG. The market basket for inpatient services included all hospitalizations associated with a DRG that occurred in at least once in the years being compared (2006 and 2007 or 2007 and 2008). For each carrier, the number of admissions was calculated as the total number of inpatient stays for that DRG. Price was calculated as the average price across all hospitals for inpatient stays associated with that DRG.

Because most carriers used a different DRG grouper or different version of the same DRG grouper to classify admissions, the change in expenditures for inpatient services was calculated separately for each carrier. Two carriers that did not consistently classify inpatient stays using the same DRG grouper across all three years were excluded from the decomposition analysis.

**Outpatient services.** The unit of analysis was a service, identified by service code. The market basket included service codes corresponding to at least one claim in both comparison years. Services associated with codes that were discontinued or newly introduced between 2006 and 2008 were not included in the market basket.

Outpatient facility claims and professional claims were decomposed separately, and a single service may be counted in the outpatient decomposition and again in the professional services decomposition, if the outpatient facility and the physician billed separately. The number of services was calculated as the sum of the service units on all claims with the given service code.<sup>8</sup> The

average price was calculated as the mean price paid by all carriers to all providers for a single unit of service associated with a service code.

**Physician or professional services.** The unit of analysis was a service, identified by a service code and modifier.<sup>9</sup> The average price for a service can differ substantially when a physician provides only the professional component, versus both the professional and facility components. The service code modifier was used to separate these services when billed under the same service code. All other aspects of the physician or professional services decomposition follow the outpatient services decomposition.

**Imaging services.** The unit of analysis and definition of average price and number of services are analogous to those used in the outpatient and professional services decomposition. The analysis considered (separately) use of outpatient hospital facilities, use of free-standing outpatient facilities, and professional charges. Inpatient facility charges for imaging services were not included, as these charges cannot be parsed from DRG payments for hospital stay.

Finally, all claims included in the decomposition analysis were sorted to identify:

- The types of admission or type of services that represent the largest expenditure for each of the service types (inpatient, outpatient, physician/professional, and radiological services); and
- The types of admissions or individual services for each service type for which total expenditures increased the most year-over-year.

## Price variation analysis

The price paid for an inpatient admission or service varies by carrier and, for each carrier, by provider. To analyze the variation in prices paid by carriers for similar services, claims corresponding to service codes or DRGs that accounted for a large proportion of total utilization in each service type were selected. Those claims were sorted to calculate the mean, 5th percentile, and 95th percentile price paid by each carrier.<sup>10</sup> Descriptive statistics showing the distribution of prices for each unit of service (by DRG or service code) across all carriers and all providers were calculated as the minimum 5th percentile price among all carriers, the maximum 95th percentile price among all carriers, and the mean of the carriers' average prices weighted by number of admissions or number of services.

## F. Hospital Efficiency Analysis

The hospital efficiency analysis is based on inpatient claims from the three carriers that identified the date of hospital discharge and also used AP-DRGs in 2007.<sup>11</sup> The analysis included only in-state hospitalizations with either medical or surgical DRGs. Maternity DRGs and hospitalizations missing DRG data were excluded.

## Identifying index hospitalizations, readmissions and physician visits

We classified all hospitalizations as either index admissions or readmissions. An index admission was any admission without a prior admission within 30 days. A readmission was any admission (to any in-state hospital, for any reason) within 30 days after discharge. Each admission was categorized as either an index admission or a readmission, but not both. This definition is consistent with recent studies of readmissions among Medicare populations.<sup>12</sup>

A readmission rate is defined as any readmission within 30 days of discharge after an index admission. This definition does not separately count multiple readmissions. However, expenditures for readmissions include all readmissions.

Physician visits are identified within 30 days of discharge or between discharge and first readmission, whichever came first. Physician visits included claims for a primary care provider or physician specialist in any non-inpatient setting.<sup>13</sup>

To identify the five medical and the five surgical DRGs with the highest rates of readmission, we first identified the 30 most frequently coded medical and surgical DRGs in the claims data to preclude selecting low-frequency DRGs, regardless of the rate of readmission. The DRGs with the highest readmission rates then were selected from among the 30 most frequent medical and surgical DRGs.

## Limitations of the efficiency analysis

The scope of the readmissions analysis was constrained by both the time and resources available for this study. Specifically, we did not pursue a number of refinements that might affect interpretation of the results or their usefulness to clinicians and policymakers. For example, we did not adjust readmission rates for differences in patient acuity. Such adjustments might affect differences in rates of readmission to teaching versus nonteaching hospitals. Adjusting for acuity could also affect the systematic difference in the patient's probability of having seen a physician following discharge: if teaching hospitals treat more acute patients who (all else equal) are more likely to be readmitted early, such patients would systematically have less opportunity to see a physician between discharge and readmission.

In addition, some readmissions may be unrelated to the index admission, and some may not be avoidable. We did not attempt to distinguish either related or avoidable readmissions from overall readmissions, nor did we attempt to group DRGs into clinically relevant categories (e.g., all DRGs related to pneumonia). Understanding rates of avoidable readmission and readmissions in clinically relevant categories could be helpful to clinicians and policymakers in developing strategies to improve the efficiency of hospital care in Massachusetts.



## Endnotes for Technical Appendix

<sup>1</sup> Enrollees in Medicare, Medicaid, the Federal Employee Health Benefit Plan (FEHBP), and Commonwealth Care were not included.

<sup>2</sup> Massachusetts Division of Health Care Finance and Policy, unpublished data.

<sup>3</sup> While we did not restrict the outpatient hospital analysis to a specific location of service, the vast majority of outpatient claims indicated outpatient hospital or emergency room as the location of service. Any claim that a carrier submitted in its outpatient data file with a provider type of “hospital” and a different location of service was checked to confirm that it was for an outpatient hospital service. In most cases, such claims indicated a specific location of service within a hospital such as “radiology” or “laboratory”.

<sup>4</sup> Maternity and newborn care included all admissions related to pregnancy, delivery, and newborn care (CMS Major Diagnostic Categories 14 and 15).

<sup>5</sup> In some cases, physicians billed for both the facility and professional components of an imaging service. When this occurred, the expenditures and utilization associated with the claim were included in the physician category.

<sup>6</sup> These four categories are defined to be mutually exclusive, so that the change in expenditures for each category sums to the change in total medical expenditures (except for a small number of services not included in the market basket). The decomposition for inpatient and outpatient hospital and free-standing outpatient facilities includes only expenditures related to use of facilities. All expenditures for physician services, regardless of the location of service (inpatient, outpatient, ambulatory surgery center, or office-based) are included in physician and other professional services. A single episode of care from a patient’s perspective—for instance, a visit to the emergency room—may result in more than one claim from different providers, and would be counted in each relevant category.

<sup>7</sup> The algorithm for identifying outlier values is as follows. For each carrier, start at the 90th percentile of the price distribution for each DRG or procedure code and search upward through each percentile until the upper bound is set or the maximum price is reached. The upper bound is set as  $1.2 * P_i$  if the ratio of  $P_i$  to  $P_{i+1}$  is greater than 1.5. Discard all claims with prices above the upper bound.

<sup>8</sup> For the decomposition analysis, the number of services was measured as a service unit (versus a claim) in order to track changes in price more accurately. When the number of service units reported on a claim was greater than one, the price for each unit was set equal to the total allowed amount divided by the number of service units.

<sup>9</sup> Professionals may bill for the professional component only (modifier 26), the technical component only (modifier TC), or for both components (no modifier or modifiers other than 26 and TC).

<sup>10</sup> Selecting the 5th and 95th percentile prices is intended to eliminate outlier payments. The 5th and 95th percentile prices show much less variation than the minimum and maximum prices paid by each carrier.

<sup>11</sup> Two of these carriers used version 21; the other used version 14.

<sup>12</sup> For example, see: Krumholz et al. Patterns of Hospital Performance in Acute Myocardial Infarction and Heart Failure 30-Day Mortality and Readmission. *Circ Cardiovasc Qual Outcomes* 2009; 2: 1-7.

<sup>13</sup> Primary care physicians included general practice, family practice, internal medicine, obstetrics and gynecology, pediatrics, geriatric medicine, preventive medicine, public health & general preventive medicine, and adolescent medicine. All other physicians were classified as specialists. We limited to the non-inpatient setting to ensure that the visit occurred post-discharge and, if relevant, before readmission.



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